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ABSTRACT

One of Kenya's major national priorities is the implementation of the policy of making the district the focus for development, thereby bringing the people into the forefront of provision for their own welfare. The second priority is the introduction of an 8-4-4 (8 years primary, 4 years secondary, 4 years university) education program to replace the existing 7-6-3 education program. Since Kenya's independence in 1963, its system of vocational-technical education has been regulated by 12 main policy documents. The country's entire vocational-technical curriculum is currently in the process of being reorganized. Industrial education was introduced into academic secondary schools in 1961. Programs in agriculture, business, and home science are offered. A number of technician and craft programs are also available, as are programs of study through national polytechnics and colleges. The main achievement of the productive work programs in vocational-technical education at craft and technical schools is that they have proved capable of mobilizing personnel and resources at the local level, thus benefiting local communities (especially in rural settings). However, these programs have also been hindered by a lack of effective organization and marketing efforts. (Appendixes include data on the numbers of present training institutions in Kenya.) (MN)

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28

STUDIES IN TECHNICAL AND VOCATIONAL EDUCATION

ED300528

Republic of Kenya

1985

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Organisation of Productive Work in Technical and Vocational Education

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5. Politique, Planification et Administration de l'Enseignement Technique et Professionnel en Turquie (1983, French).

6. Politique, Planification et Administration de l'Enseignement Technique et Professionnel en Algérie (1983, French).

7. Policy, Planning and Administration of Technical and Vocational Education in the Netherlands (1983, English).

8. Policy, Planning and Administration of Technical and Vocational Education in India (1983, English).

9. Computers in Technical Teacher Education in the United Kingdom (1984, English, Arabic).

10. Computer Sciences in Vocational Teacher Education in Denmark (1984, English).

11. The Organisation of Educational and Vocational Guidance Services (1985, English).

12. Policy, Planning and Management of Technical and Vocational Education in the Hashemite Kingdom of Jordan (1985, Arabic).

ORGANIZATION OF PRODUCTIVE WORK

IN TECHNICAL AND VOCATIONAL EDUCATION

IN KENYA

Prepared for Unesco
by
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Nairobi, 1985

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PREFACE

The present document is a further addition to the series "Studies in Technical and Vocational Education". These studies are based on a Unesco policy instrument, the Revised Recommendation concerning Technical and Vocational Education, which was adopted by the General Conference at its eighteenth session in November 1974. Furthermore, they are in conformity with Approved Programmes 20 C/5, 21 C/5, 22 C/5 and 23 C/5, which indicated that a number of guides, studies and publications in the field of technical and vocational education would be reproduced. The studies are intended to assist policy-makers, planners, administrators and experts in technical and vocational education. They reflect Unesco's concern with fostering an effective exchange of experiences and ideas in this field as well as Member States' efforts in promoting the implementation of the Revised Recommendation and the development and expansion of technical and vocational education.

The studies, which were prepared under contract for Unesco, should be considered as information documents that require continual revision and updating. A list of the studies appears at the beginning of this document.

We wish to express our appreciation to all those who participated in preparing this study and hope that it will provide its readers with information useful to them in the promotion and development of technical and vocational education.

The views expressed in this study are those of the individual(s) concerned with its preparation and do not necessarily reflect those of Unesco. The designations employed and the presentation of the material do not imply the expression of any opinion whatsoever on the part of the Unesco Secretariat concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

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A C K N O W L E D G M E N T S

I wish to thank Mr. J.B. Mburugu, Senior Inspector of Schools in charge of Business Studies in my Department for gathering the basic data. I should like to express my appreciation to Annet Munyi and Rose Owino for the great effort they made to type the manuscript.

October 1985

DMM

LIST OF ABBREVIATIONS

GOK	Government of Kenya
HIT	Harambee Institute of Technology
IE	Industrial Education
KACE	Kenya Advanced Certificate of Education (certificate obtained on successful performance in an examination taken after 6 years of secondary education or 'A' level)
KCE	Kenya Certificate of Education (Certificate awarded on successful performance in an examination taken after 4 years of secondary education or 'O' level)
K£	Kenya Pound = 20 Kenya shillings
Ksh	Kenya shilling (official Kenya currency)
KSTC	Kenya Science Teachers College
KTTC	Kenya Technical Teachers College
KUC	Kenyatta University College (Now Kenyatta University)
MCSS	Ministry of Culture and Social Services
MEST	Ministry of Education, Science and Technology
SEP	Secondary Education Project
PEP	Primary Education Project
SIDA	Swedish International Development Agency
TEP	Technical Education Project
TVE	Technical and Vocational Education
YP	Youth Polytechnic

PART ONE

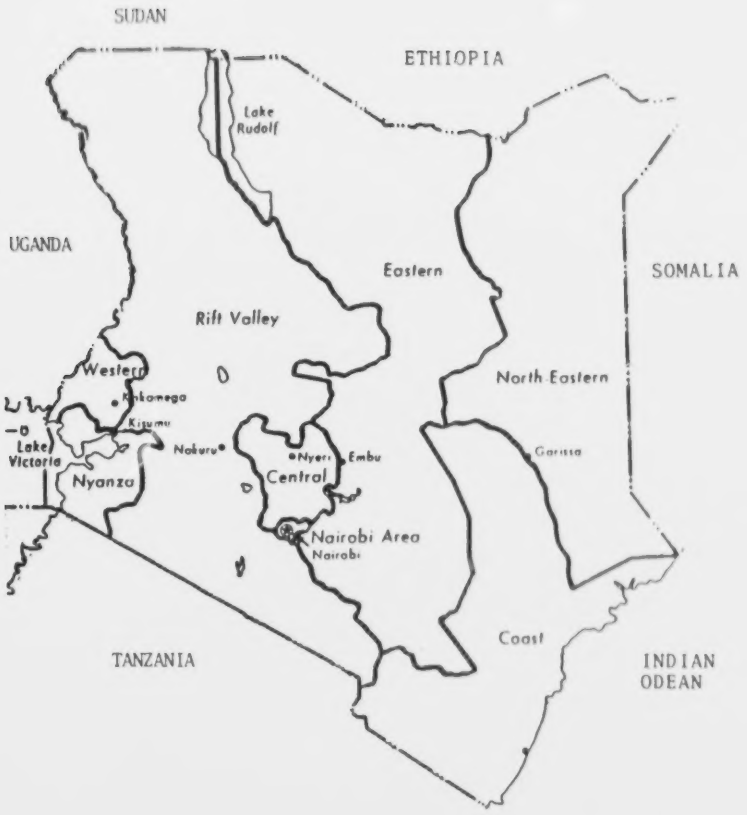
BACKGROUND INFORMATION

KENYA is a former British colony which gained independence on 12th December 1963. The country is divided into 8 administrative provinces which are further divided into 42 districts as shown in maps on pages 5 and 6. The capital of Kenya is Nairobi, with a population of approximately one million residents.

The growth of the economy for the last 20 years since independence, i.e. 1964 to 1983 has been at an average annual rate of 5.2 per cent considering an average population growth rate of 3.6 per cent for the whole period, the per capita income has grown at an average rate of 1.5 per cent. However, due to adverse effects of the worsening in the country's term's of trade as a result of international economic recession, the increase on prices and the recent drought, the per capita incomes have shown a declining trend. On the other hand it is important to observe that the production of Governement services was the fastest growing sector followed by industry, then by other services and thereafter agriculture. The relative growth of Government services has been in keeping with the objective of promoting African Socialism through state control and direction of the nations resources.

Currently, one of the major national preoccupation is the implementation of the policy of making the district the focus for developent thereby bringing the people into the forefront of their own provision of things for their own welfare. The second preoccupation is the introduction of the 8-4-4 education programme to replace the existing 7-6-3 education programme.

MAP OF KENYA AND ITS DISTRICTS



PART TWO

THE COUNTRY PROFILE

Legislations in force which affect Technical and Vocational Education in Kenya.

The legal framework for Kenya's TVE since independence has been created and operated under the following policy documents.

1. The 1963 Kenya African National Union (KANU) manifesto by which the Government committed itself to eventual provision of universal free education and spelt out other socio-economic aspirations to be met by education.

2. The sessional paper N° 10 of 1965, in which education was seen as "much more of an economic than social service ..... the principal means for relieving the shortage of domestic skilled manpower and equalizing economic opportunities among all citizens."

3. Education Act (1968), Revised (1980), which put the responsibility for education in the hands of the Minister for Education and instituted various organs for the organisation and management of education at all levels.

4. The Board of Adult Education Act (1966) established the Board of Adult Education to co-ordinate and promote activities in adult education.

5. The Teachers Service Commission Act (1967) established a single employer and unified terms of service for all teachers.

6. The University of Nairobi Act (1970), revised 1985, established a National University.

7. The National Council of Science and Technology Act (1978) established a body to co-ordinate research in science and technology and to advice the Government on relevant policy matters.

8. The Industrial Training Act (1979) established to raise funds for training in TVE and regulate the training of apprenticeships and indentured learners.

9. The Kenya National Examinations Council Act (1980) established as a national body to administer public examinations including those in TVE.

10. The Moi University Act (1984) established Moi University which will be a technological oriented University.

11. Kenyatta University Act (1985), established to train teachers at secondary and post-secondary education levels.

12. The Higher Education Council Act (1985) established to regulate the operation of University education including the running of private Universities.

ADMINISTRATIVE STRUCTURE

This has been displayed in Annex II - B

STRUCTURE OF THE EDUCATIONAL SYSTEM

This has been displayed in Annex II - C.

Details on types of schools as well as entrance examinations required and certification awarded have been described from page 86 to page 87.

ENROLMENT STATISTICS

The available data does not show areas of specialisation as required in Table 1 Form B. Therefore the data contained in this table especially in terms of areas of specialisation is based on estimates.

There is inadequate collection of data on enrolments for courses outlined under Technical and Vocational Education. The data shown in this table regarding this section is therefore incomplete. What is shown is collected from some of the largest institutions involved in Technical and Vocational Education.

A detailed national survey would be required to gather all the data on enrolment in different training institutions.

In Table II some of the areas of specialisation do not render themselves to part time vocational education. This is so in the case of Fine Arts and Applied Arts and agricultural, forestry and fishery programmes.

However, some areas such as Engineering programmes which are not listed under this table are popular for part-time vocational education.

In Table III, it should be noted that persons aged under 18 are not employable in Kenya. There is no data regarding those who are employed but not enrolled in education and those unemployed and not enrolled in

education. The only category whose data is available as of 1979 are those aged between 15 and 19 years who are not enrolled in any form of education.

In 1979, a large number, nearly half a million youth aged between 15 and 19 years were still attending primary education. This figure is likely to have decreased because of the rapid expansion of secondary schools since then thus minimising repeating and also because many children these days go to schools at the age of 6 years insted of going at the age of 8 or 9 years as was the case in the past.

CURRICULUM

At the moment the entire curriculum in technical and vocational education is in the process of reorganisation. The curriculum for artisan courses has been overhauled. The sample given in Form C is only for full-time attendance as that for part-time attendance has not been designed.

PART THREE

THE ORGANISATION OF PRODUCTIVE WORK IN TECHNICAL AND VOCATIONAL EDUCATION IN KENYA AT THE CRAFT AND TECHNICIAN LEVELS

A. INTRODUCTION

The history of the formal education systems in almost all developing countries reveals consistent attempts to diversify secondary education away from its dominant academic norm into vocationalised direction through introduction of a wide range of programmes. A broad range of goals have been articulated for such programmes. They range from the provision within school contexts of relevant skills, values, attitudes and knowledge for modern sectors of agrarian employment to the provision of solutions to problems of urban migration and unemployment.

In Kenya, the introduction and expansion of technical and vocational education was witnessed in a large scale in the early 1970s. This move was a result of Government's reaction to public pressure for increased practical skills in the field of general secondary education. The purpose of introducing these subjects was "to relate national needs of people to work in craft and industrial - based, wage-earning jobs to the need for increasing numbers of people to seek profitable self-employment in this type of work".

In 1982 the Government of Kenya decided to restructure the entire education and replace the 7-6-3 system with 8-4-4 system. This change to the new system has placed a great challenge to vocational and technical education and training programmes in the country.

---

1. Republic of Kenya, Ministry of Education. A study of curriculum Development in Kenya, A Report of Advisory Mission led by Gordon S. Bessey, C.B.E., M.A., D-C.L., 1972.

B. HISTORICAL BACKGROUND OF TECHNICAL AND VOCATIONAL EDUCATION IN KENYA

In Kenya, the history of technical and vocational education and training goes back to the time of establishment of a training Depot at Kabete in 1924. The Native Industrial Training Depot at Kabete (N.I.T.D.) was established to provide training for the ex-servicemen who had served in the 1914 1918 World war. In 1949, the Native Industrial Training Depot at Kabete was changed into a Technical and Trades School. In the 1949-50, eight other Technical and Trade schools were started in different parts of the country. Five other Technical and Trades schools were established later.

Technical and Trades schools admitted students who had done well in the final examination after eight years of primary school but failed to find places in the few secondary schools. The technical and trades schools followed purely trade syllabuses in areas such as Building, Mechanical, Electrical, Tailoring, etc, for one year. At the end of one year, students sat for selection examinations and those who did well followed or four years a further trade syllabus supported with subjects such as English Language, Mathematics, Science and Civics. After the four years, students took Government Trade tests Grade III which on passing enabled them to get a job as artisan in industry.

In 1956 the Royal Technical college (Now Nairobi University) was set up to offer more advanced technical courses leading to technician and professional qualifications in various fiels. In 1961, Kenya Polytechnic was opened to take over the courses of the Royal Technical College because the latter became a constituent college of the University of East Africa. The courses at the Kenya Polytechnic included a wide range of technical courses at craft level, Ordinary National Certificate and Higher National Certificate. Later, the craft courses were phased out and replaced with technician courses. The National Certificate courses were replace with Ordinary Diploma and Higher Diploma respectively. In 1972, Mombasa Technical Institute former Mombase Institute of Muslim Education was renamed Mombasa Polytechnic to offer similar courses to those offered at the Kenya Polytechnic.

In 1969, all the 13 Technical and Trades Schools were converted into Technical and Vocational Secondary Schools. As the interest in technical and vocational education increased, four new schools were added. With the conversion of Technical and Trades schools a new curriculum was introduced to follow the syllabuses of the City and Guilds of London. The new syllabuses were intended to combine the general technical education with some academic studies in the first two years of secondary schools and to specialize in one particular trade during the third year. At the end of two years, students sat for a final examination known as Kenya Junior Secondary Technical Examination (KJSE) and the results of this examination was used to select and place students into various trade specialisations such as masonry, mechanical enginnering, automotive engineering, carpentry and joinery, etc.. At the end of the third year, students sat for the examination of City and Guilds Craft Certificate, Part I.

In 1970, the three-year City and Guilds Crafts Part I syllabus was replaced with a four-tear technical education curriculum (40 per cent practical and 60 per cent theoretical) which was first examined by the East African Examinations Council in 1974 in the same pattern as the academic subjects. The stress in the four-year curricula was to produce secondary school leavers who are academically sound and competent to benefit from further training opportunities at the national polytechnics and other similar institutions of learning.

In addition to the conventional technical trades, the curricula included mathematics, English, Geography and for girls Tailoring and Business Education. Good examination peformances is emphasized. This change made these institutions to lose their vocational training roles.

Before 1969, the six-year curricula which consisted of 90 per cent practical and 10 per cent theory offered in the technical and trade schools emphasised on preparing the student for direct wage or self-employment. In effect, the technical secondary school curriculum which was introduced In 1970 is conceptualized as schools based incomplete

vocational training that needs to be complemented by some kind of employment-based further training leading to craft apprenticeships or technical apprenticeships administered by the Directorate of Industrial Training.

The students who finish their education from these schools are as vulnerable to unemployment as those who finish their general education in ordinary secondary schools. The date, the majority of these are joining Form 5 for further academic education. This means that although technical education is very expensive, it is not economically viable under the present set up. The Government of Kenya has therefore decided that these institutions be converted into training institutions.

The Courses offered in the existing 19 institutions are outlined on the following page.

SCHOOL	PROGRAMME	OUTPUT/LEVEL
1. Kabete	a) Basic Building Trades	'0' level
	b) Basic Mechanical Trades	"
	c) Basic Electrical Trades	"
	d) Basic Automotive Trades	
2. Machakos	a) Basic Mechanical Trades	"
	b) Basic Automotive Trades	"
	c) Basic Electrical Trades	"
3. Meru	a) Basic Building Trades	"
	b) Basic Carpentry/Joinery	"
	c) Basic Plumbing Trades	"
4. Thika	a) Basic Mechanical Trades	"
	b) Basic Electrical Trades	"
	c) Basic Automotive Trades	"
	d) Basic Agricultural Mechanical Trades	"
5. Sigalagala	a) Basic Building Trades	"
	b) Surveying	"
	c) Basic Plumbing Trades	"
	d) Basic Carpentry/Joinery	"
6. Rift Valley	a) Basic Mechanic Trades	"
	b) Basic Automotive Trades	"
	c) Basic Electrical Trades	"
	d) Basic Welding Trades	"
7. Kisumu	a) Basic Mechanical Trades	"
	b) Basic Electrical Trades	"
	c) Basic Automotive Trades	"

8. Kaiboi	a) Basic Mechanical Trades	"
	b) Basic Agricultural Mechanical	"
	c) Basic Automotive Trades	"
9. Mawego	a) Basic Building Trades	"
	b) Basic Carpentry/Joinery	"
	c) Basic Plumbing Trades	"
10. Mombasa	a) Basic Building Trades	
	b) Basic Carpentry/Joinery Trades	"
11. Nairobi	a) Basic Mechanical Trades	"
	b) Basic Electrical Trades	"
	c) Basic Automotive Trades	"
12. Kakuro	a) Basic Mechanical Trades	"
	b) Basic Automotive Trades	"
	c) Secretarial Skills	"
	d) Basic Electrical Trades	"
	e) Accountancy	"
13. Nyeri	a) Basic Mechanical Trades	"
	b) Basic Automotive Trades	"
	c) Basic Agricultural Mechanical Trades	"
	d) Secretarial Skills	"
	e) Basic Welding Trades	"
	f) Tailoring and Fashion Design	"
	g) Accountancy	"
14. Kinyanjui	a) Secretarial Skills	"
	b) Basic Automotive Trades	"
15. N'Kabune Girls	a) Secretarial Skills	"

16. Sagana (Assisted)	a) Basic Mechanical Trades	"
	b) Basic Automotive Trades	"
17. Masai	a) Basic Automotive Trades	"
	b) Basic Water Engineering Trades	"
	c) Basic Building Trades	"
	d) Basic Carpentry/Joinery Trades	"
18. Kitale	a) Basic Mechanical Trades	"
	b) Basic Automotive Trades	"
	c) Basic Agricultural Mechanics Trades	"
	d) Basic Electrical Trades	"
19. North Eastern (New)	a) Basic Building Trades	"
	b) Accountancy	"

INDUSTRIAL EDUCATION IN ACADEMIC SECONDARY SCHOOLS

Industrial Education was introduced in the post-independence education system in Kenya beginning from 1961. By 1966 there were 15 secondary schools teaching Industrial Arts Education such as Woodwork, Metal work, and domestic science for girls. In 1974, the Swedish Government through the Swedish International Development Agency, agreed to support by enlarging and modernising the industrial education workshops in 15 secondary schools and building new workshops in 20 other secondary schools. By 1982, a total of 35 Industrial Education Schools were fully equipped. Today these schools teach either woodwork Technology or Metalwork Technology or Power Technology or Electrical Technology or Technical Drawing together with other academic subjects. The purpose of these subjects is to equip the students with knowledge and practical skills in the use of tools, materials and machines and to develop in them an insight and understanding of the industry and its place in the Kenyan society. The course is also intended to develop positive attitudes towards the world of work and provide a foundation for further education and training.

AGRICULTURE

By 1972 only 38 secondary schools offered general agriculture. At the end of 1974, about 100 secondary schools offered general agriculture. As of 1984, secondary schools offered agriculture for the final examinations of secondary education. This subject is intended to develop skills and knowledge which would lead the student to develop positive attitudes towards respecting agriculture as an occupation that is both profitable and honourable. The youth is made to appreciate that by application of scientific principles and modern farming practices, they can transform labour into a lucrative business especially in the rural areas.

BUSINESS EDUCATION

Business Education was intensively introduced in the academic secondary schools as part of vocational training beginning from early 1970. By 1974, 30 secondary schools offered one or more business education subjects. By 1984 there were more than 500 secondary schools teaching these subjects. The aim of these subjects is to increase the individual's knowledge and awareness of business and commercial activities in order to enable him to make intelligent and logical economic decisions. In addition, the knowledge and skills should enable him to obtain some basic utility skills, be self-reliant in the business world both in rural and urban areas and to be innovative and have initiative. Finally the individual should develop a sufficient foundation for further academic education and professional studies.

HOME SCIENCE

Like the other practical subjects home science was given a major emphasis in the secondary school curriculum in early 1970s when facilities were established in 29 secondary schools throughout the country. As at 1984,

there were 200 secondary schools in Kenya. The purpose of this subject is to expose the youth to the importance of working in craft and wage earning activities in an effert to seek self-employment. This subject like the other practical subjects should encourage attitudes which not only pay due regard to the economic value of these skills but also transform indifference towards recognition that craftwork of all kinds demands intelligence and persistence and skill of a high order.

EXISTING TECHNICIAN AND CRAFT PROGRAMMES

These programmes fall under the following categories:

i) Technician apprentices sponsored by the employer, are trained in National Industrial Vocational Training Centres situated in Nairobi, Mombasa and Kisumu. This programme involves a purely practical training of craft and technicians apprentices. The training is administered by the Directorate of Industrial Training which was established in 1965 under the Ministry of Labour and whose council is constituted by employers in the public and private sectors. Holders of 'O' level certificate of education are admitted to joint the secondary apprenticeship courses.

ii) Technician courses Parts I-III Ordinary Technician Diploma and Higher Technician Diploma Programmes are taught at Kenya Polytechnic, Mombasa Polytechnic and Jomo Kenyatta College of Agriculture and Technology, which provide the largest training avenue at this level. Technician courses which last 4-5 years and ordinary Technician Diploma which last 2½ years are open to secondary school leavers. Holders of Technician Parts III who wish to take the Higher Technician Diploma take a bridging course consisting of advanced Mathematics and Sciences for one year and complete the Higher Diploma in 2½ years. The Technician courses Parts I-III are more practical in approach than the Diploma Courses which are more theoretical. Attendance for technician courses is usually sandwich or block-release while attendance for Diploma courses is full-time study. The present Higher Diploma in

Engineering or Building courses is regarded equivalent to a first degree in the respective field. A third Polytechnic known as Eldoret Polytechnic is expected to start offering ordinary Diploma and Technician courses in 1987.

iii) Craft part I and II courses are offered at the Kenya Technical Teachers College and 15 Harambee Institutes of Technology. The standard of these craft courses is comparable to the Technician part I - II and the ordinary diploma courses offered at the National Polytechnics mentioned earlier. However, most of the Harambee Institutes of Technology lack adequate physical facilities, equipment, qualified staff and recurrent expenditure. The craft and technician courses in the last two categories are outlined below :

1. NATIONAL POLYTECHNICS AND COLLEGES

i) Craft courses

1. Electrical Installation
2. Printing Craft Courses
3. Junior Building Supervisors
4. Plumbing Services

ii) Technician courses

1. Agricultural Engineering
2. Mechanical Engineering Production
3. Mechanical Engineering Plant
4. Welding and Fabrication
5. Motor Vehicle
6. Refrigeration Engineering
7. Heating, Ventilation and Air Conditioning
8. Construction Plant
9. Electrical Engineering (Power)

10. Electrical Installation
11. Radio, Television and Electronics
12. Building Construction
13. Telecommunication Engineering
14. Industrial Measurements and Control
15. Architectural
16. Irrigation Engineering

iii) Ordinary diploma courses

1. Horticulture
2. Food Processing
3. Agricultural Engineering
4. Institutional Management
5. Mechanical Engineering
6. Electrical Engineering
7. Civil Engineering
8. Land Surveying
9. Cartography and Air Survey
10. Building Construction
11. Applied Chemistry (Analytical)
12. Applied Chemistry (Industrial)
13. Applied Biology (Histology/Citology and Anatomy/Museum)
14. Applied Biology (Animal Physiology/Pharmacology and Taxicology)
15. Applied Biology (Ematology and P st Control Plan Pathology)
16. Medical Laboratory Technology (Microbiology/Immunology)
17. Medical Laboratory Technology (Histopathology/Anatomy)
18. Medical Laboratory Technology (Chemical Pathology/ Haemotology and Serology/Immunology)
19. Food Technology (Food Engineering)
20. Food Technologyy (Food Quality Control)
21. Diploma in Management

22. Water Engineering
23. Computer Sciences
24. Supplies Management
25. Transport Management
26. Secretarial Studies

iv) Higher diploma courses

1. Mechanical Engineering
2. Electrical Engineering
3. Electronic Engineering
4. Water Engineering
5. Highway Engineering
6. Civil Engineering
7. Building Construction/Economics
8. Land Surveying
9. Cartography and Air Survey
10. Applied Sciences

11. HARAMBEE INSTITUTES OF TECHNOLOGY AND KTTC

1. Radio and T.V. Servicing Craft
2. Mechanical Engineering Production Craft
3. Mechanical Engineering Plant Craft
4. Electrical Engineering Power Craft
5. Motor Vehicle Mechanics Craft
6. Electrical Installation Craft
7. Building Construction
8. Agricultural Mechanics Craft
9. Carpentry and Joinery craft
10. Plumbing Services Craft
11. Blocklaying and Concreting Craft

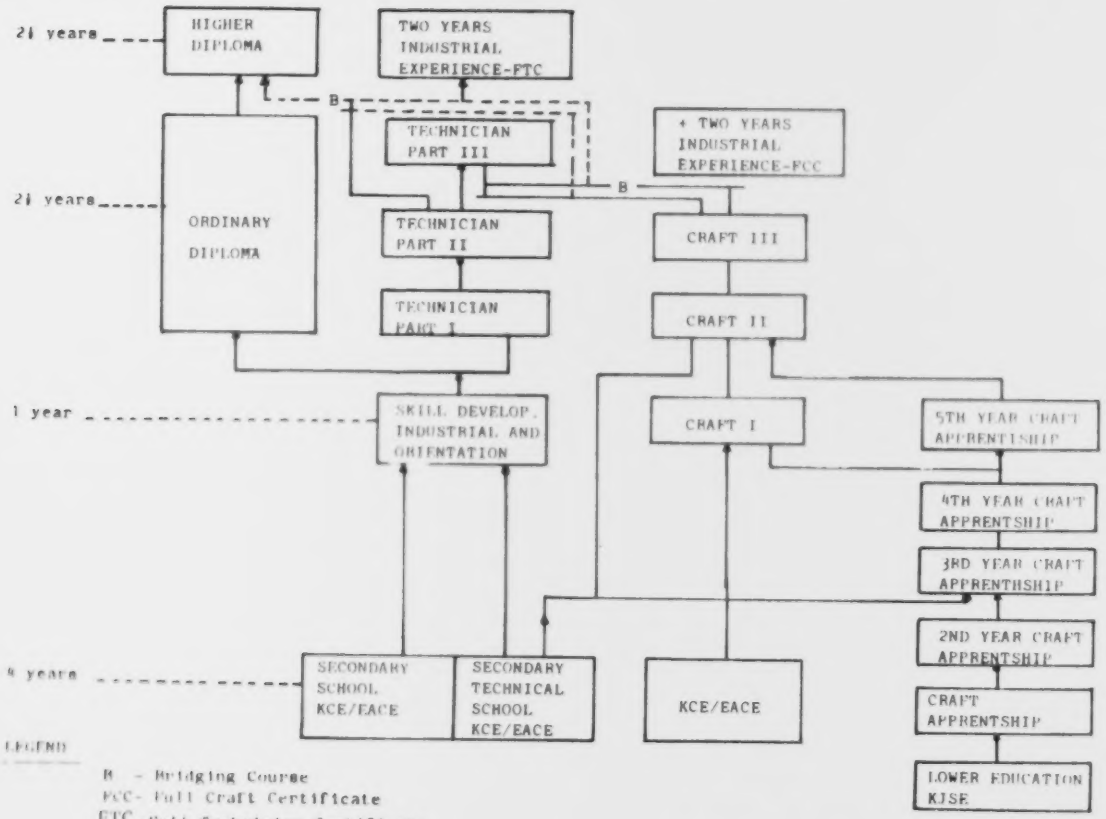
12. Garment Manufacture
13. General Agriculture
14. Dryland Farming
15. Accountancy, ACNC, CPA and CPS (Part 1)
16. Secretarial Skills (Typing, Shorthand, etc.)
17. Water Operators Courses
18. Transport Management

It is important to note that Harambee Institutes of Technology are training institutions established beginning early 1970s in the rural areas as local self-help projects in an effort to provide technical training to students who have finished secondary school education. In 1974, the Government (through the then Ministry of Education) incorporated the Harambee Institutes of Technology within national system of technical education and training. The graduates from these institutions are expected to be able to carry out technical jobs within the framework of a modern industrial enterprise, or to furnish technical expertise in the local community.

By 1983, 14 Harambee institutes of technology had witnessed successful graduation of 2.999 students in different courses. The total student enrolment in these institutions during the 1983/84 academic year were 3.904. These graduates are encouraged to go into self-employment but the majority are employed in the public and private sectors.

The flow chart shown in figure 1 gives a diagrammatical presentation of the programmes offered at the Craft and Technician levels.

TECHNICAL EDUCATION FLOW-CHART



YOUTH POLYTECHNICS

The issue of school leavers with a view to exploring ways and means of expanding training opportunities to absorb the soaring masses of these school leavers has been of a major concern to every Kenyan since independence. In 1966, the National Christian Council of Kenya (N.C.C.K.) raised this issue particularly for primary school leavers and suggested a practical solution. In 1967, the N.C.C.K. established a few training institutions known as Village Polytechnics for primary school leavers. Later, the responsibility of these institutions was left in the hands of the local communities in partnership with the Government, currently through the Ministry of Culture and Social Services. Today, these institutions are known as Youth Polytechnics. Currently, (1985) there are 320 Youth Polytechnics spread throughout the Republic of Kenya and with an annual enrolment of 15.000 trainees. The Youth Polytecnics are currently using vocational based training syllabuses which lead to Government Trade Test practical examinations. A few of them offer business studies courses which are examined by the Kenya National Examinations Council. This curriculum emphasis technical and practical work skills at Artisan level and run for 12 to 24 months. In addition to the 320 polytechnics, there are 170 youth centres run by religious organisations. These centres offer a curriculum similar to that of the youth polytechnics. The physical facilities such as workshops, classrooms dormitories and teaching equipment in this category of institutes are of different qualities and quantites because of varying financial abilities available to local communities.

Youth polytechnics are basically rural institutions and communities have to find most of their resources themselves. The Government assists with salaries for instructors some tools and equipment. A large proportion of assistance has been forthcoming to youth polytecnics,tools and equipment from the Non-Government Organisations (NGO'S) such as CARE-Kenya and Action Aid-Kenya.

KENYA INDUSTRIAL TRAINING INSTITUTE

This institute is sponsored and organised by the Ministry of Commerce and Industry and furnishes technical training in a variety of fields. Graduates from this institute seek employment throughout the country or engage in self-employment business activities.

INDUSTRIAL EDUCATION AND TECHNICAL EDUCATION COSTS

The major proportion of capital and recurrent cost for the introduction and implementation of Industrial Education and Technical Education curriculum in Kenya has largely been funded by Swedish International Development Agency which consists of 75 per cent of the total project costs. The table below gives an analysis of this funding.

ANALYSIS OF SIDA FINANCED I.E. PROJECT - COSTS FOR PERIOD BETWEEN 1974 AND 1984

CATEGORY OF EXPENDITURE	AMOUNT KSHS.
Building: New and renovated workshop	11.507.000
Staff houses	2.200.000
Electricity	500.000
Furniture	836.686
Equipment	9.513.191
Professional services	364.844
Project office	(100)
Technical assistance	(2.595.000)
Volunteers	(100.000)
Kabete Maintenance Unit	(558.000)
TOTAL EXPENDITURE	28.194.821

Bracketed figures are heavily estimated.

SOURCE: An Evaluation of Industrial Education in Kenya. The contribution of cost studies, by Dr. C.E. Cunning Moray House College of Education, Edimburg, U.K., 1984.

Development costs, being building and equipment combined constitute the biggest portion of costs.
On the side of recurrent expenditure, salaries and allowances for teachers-takes the lions share of the costs. From the studies of Dr. Cumming of 12 schools offering industrial education in 1982, salaries and allowances of this category of staff constituted 50 per cent of the total recurrent expenditure of Kshs. 38.088/=

A similar trend of costs is observed in the case of development costs and recurrent costs in technical schools. A summary of SIDA funding of technical secondary schools is shown below :

SUMMARY OF SIDA FINANCED TECHNICAL SCHOOLS-COSTS COVERING 1975 DECEMBER-1983

CATEGORY OF EXPENDITURE	AMOUNT KSHS.
Building	93.637.757.80
Equipment	17.781.513,55
Furniture	2.848.979,70
Professional services	3.382.120,60
TOTAL EXPENDITURE	117.670.371,65

C. TECHNICAL AND VOCATIONAL EDUCATION IN THE 8-4-4 SYSTEM OF EDUCATION

INTRODUCTION

Human resources is the greatest development asset any nation can possess. Kenya's goal is that the labour force obtains gainful employment, but most modern economic activities require sophisticated technology and manpower with middle and high level of education and training. Nearly 85 per cent of Kenya's population lives and works in the rural areas. About 75 per cent of this labour force is engaged in farming and pastoralism and the rest in non-farm activities. The majority of the school leavers who enter the labour market are poorly equipped to take up opportunities for meaningful employment or self-employment due to inadequate technical and vocational training.

As Kenya moves into the 8-4-4 education system, the number of school leavers from both primary and secondary levels will increase significantly and will raise a high demand for a well articulated training system. The economy, both at the formal and informal sectors will likewise demand more and more skilled manpower, especially at the lower and middle levels as we seek to modernize rural life through the implementation of the new Government Policy on the District focus for Rural Development. In addition, we must aim at increasing the national training capacity by almost three fold as envisaged by the National Council for Science and Technology so that by the year 2.000 we may arrive at a ratio of 1 professional: 10 technicians: 30 craftsmen/artisans.

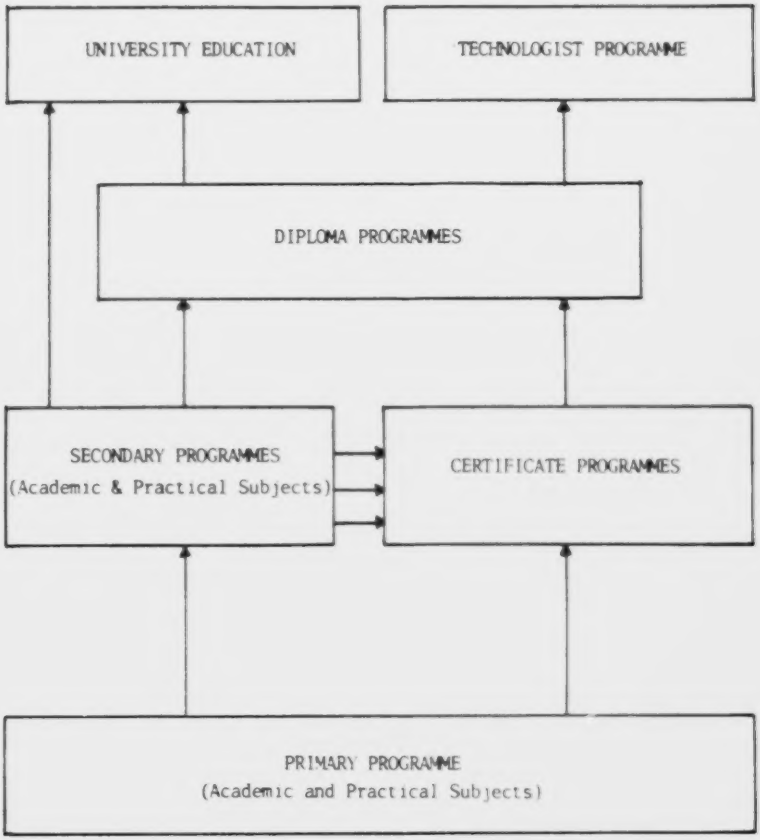
AIMS AND OBJECTIVES OF TECHNICAL AND VOCATIONAL EDUCATION

a) The main aims are :

i) To extend training opportunities, to meet the demands of those students who will terminate their formal schooling at the primary or secondary education cycles.

A FLOW CHART OF

TECHNICAL EDUCATION AND TRAINING PROGRAMMES IN 8:4:4



ii) To impart the necessary practical skills and attitudes as equipement for the individuals means to survival in the Kenyan society.

b) The general objectives of technical and vocational education at post-primary and post-secondary levels are to :

i) Provide increased training opportunities for the increasing number of school leavers, to enable them to be self-supporting in pursuit of earning a living through team-work and companionship or through individual initiatives.

ii) Develop practical skills and attitudes which will lead to income earning activities in the rural or urban areas through self-employment as skilled operatives, artisans, craftsmen, technicians in the formal and non-formal sectors.

iii) Provide practical education and training skills which are responsive and relevant to Kenya's Industrial and Commercial development.

iv) Provide the technical knowledge and vocational skills necessary for the rapid growth of this nation's agricultural, industrial, commercial and other economic development.

v) Provide people who can apply scientific knowledge to the improvement and solution of environment problems for the use and convenience of man.

To achieve the objectives of the 8-4-4 system of education, a new structure of technical and vocational education and training has been adopted. A flow chart of this structure is shown in figure II and a detailed explanation of the chart is given below.

SALIENT FEATURES OF THE 8-4-4 EDUCATION SYSTEM

The new system which came into force in January, 1985 means that children will spend 8 years in Primary Scools, 4 years in Secondary schools and for the lucky few, 4 years in the University.

There are advantages which accompany the new system. Firstly the additional year in primary school will allow children to be more mature physically than it has been the case before. This means that those who terminate their formal education after primary school will be old enough for the world of work or for job training opportunities.

Secondly the new system will provide three logical segmentations in the formal school system which will give ample allowance for curriculum diversification at each level of the formal education. At both primary and secondary school levels for example, this curriculum diversification will call for the introduction of practical subjects. The purpose of these practical subjects will not be to produce individuals who are qualified to pursue course-related professions upon leaving school, but to instil in the children an appreciation for skilled manual work, and to establish some of the basic skills required in a broad range of occupation. Each of these two segments of the formal school curriculum will be terminal. This means, in effect, those pupils who do not find a place in the next ladder of further schooling will be equiped with knowledge, skills and attitudes for vocational training or direct involvement in the world of work.

At the University level, the new system will allow room for broad based curriculum during the initial period of one's university studies and later narrowing to specialisation in professional or general degree qualification according to individual choice and inclinations.

The third advantage attributed to the new system is that it will allow the government ample opportunity to give a critical look at the whole area of vocational training with a view to tackling the endemic issues of unemployment of school leavers and the supply of technical manpower at various levels of national economy.

As it must be admitted, formal education in Kenya has expanded tremendously over the last twenty years. This quantitative expansion although desirable, has not been matched with the necessary training opportunities in the technical fields. The result of this great expansion of formal education at both primary and secondary school levels has been increased by the number of self-employment. At the same time, the country continues to lack technically qualified citizens in many fields especially at Artisan and craftsmen levels of qualification particularly those which are geared to rural development.

In order to cope with the problem of unemployement and technical manpower provision and especially in response to the district focus policy for rural development, the 8:4:4 system will seek to harmonise and rationalise vocational training programmes in all fiels.

As far as primary school leavers are concerned, it is envisaged that Youth Polytechnics and the Farmers Training Centres will play a major role of offering training for artisans in various trades. These institutions are strategically spread out in the rural areas of this country and are therefore most ideal places for rural-based artisan training programmes. At the moment, insititutions do not possess professionally articulated curricular nor are they adequately equipped. If they are to meet the future demands, the Ministry of Education Science and Technology is liasing with the parent ministries with the view to sorting out the issues pertaining to sorting physical facilities, staffing, curriculum, examinations and certification.

As it must be admitted, the success of the 8-4-4 structure of education will depend, to a large extend on the degree to which the rationalization and harmonization of vocational training is effected. This is specifically so as regards the Youth Polytechnics and Farmers Training Centres which have hitherto been viewed as places for the school failures and semi-illiterate adults. It is envisaged that, the future image of these institutions require to be improved in terms of their status and significance. They must be seen as centres of qualitative continous functional education geared to the socio-economic transformation of rural communities and the

consequent improvement of the quality of life in the rural areas. They must be seen as community based, and Harambee managed but nationally recognised institutions of vocational training. Unlike ordinary schools, these institutions can teach courses which are unit based and tailor-made to suit individuals and their particular situations. Such courses ought to be run throughout the year in such a way that everyday is both an admission day as well as a graduation day. This means that courses will be individualised: that they will be on community profiles and future expectations and aspirations of the clients.

It is only when courses are individualised, when the institutions remain open throughout the day and year, that more and more people can be trained according to their wishes as well as meeting the manpower demand of the economy.

These institutions can establish a break-through in the implementation of the concept of life-long education in a practical way. In this respect, each institution should be managed like a restaurant where the menu is a matter of individual choice and where both the time and the speed of eating are purely a matter of personal choice. Thus, like in a restaurant where services remain available throughout and at the whishes of the clients so must community technical institutions.

Part-time teaching should be encouraged in order to off-load the burden of work from the regular teachers. Such openings will also create worth-while activities for some of the vocationally qualified people who tend to spend their after-duty hours idling, in non-productive activities.

The nation can make positive utilization of such brains through the part-time teaching in the continuing education and training programmes which can easily be spear-headed by the Youth Polytechnic and similar training institutions.

As far as the secondary school leavers are oncerned, it is expected that there will be rigorous expansion and harmonization of Diploma Courses institutions throughout the country. These institutions will be known as

Institutes of Technology and they include the present Harambee Institutes of Technology, Technical High Schools and Secretarial Colleges. The harmonization will also include institutions under other Government ministries.

The expansion of training opportunities at this level is dictated by the sheer massive numbers of young people who will be terminating their formal education after four years of secondary school and who must be turned into skilled workers through training programmes of their choice and aptitude. The nation can ill afford to provide them with 12 years of schooling at public expense and then leave them without relevant skill training.

In addition to slotting secondary leavers into career training opportunities and on the basis of Aptitude Tests, the more able students among the artisans from the Youth polytechnics will be given chance to acquire advanced training in the service. Similarly technical diploma holders who show intellectual promise will be given opportunities to advance to the National Polytechnics as high as their abilities can allow.

In this way, training programmes of the future will have an inbuilt component for further advancement in order to keep pace with the rapid changes which are brought by the skill requirements in our technological world.

This is the plan for the future technical education which the Government belives must be put into force in order to pave the way for a positive march towards technological advancement and autonomy for the people and the Nation of Kenya.

TECHNICAL EDUCATION AND VOCATIONAL TRAINING

After 8 years of primary education and 4 years of secondary education, there will be outflows of students from the general education who require training in various vocational and technical education.

As indicated in the chart on page 33, the new technical education and training programme will provide opportunities for primary school leavers

at the post-primary training institutions (mainly the youth polytechnics). At this level, there will be proficiency skill development courses lasting 6-12 months and artisan skill development courses lasting two years. The students who successfully complete the artisan courses may proceed for craft skill development courses lasting 2-3 years in the youth polytechnics or in the middle colleges. Graduates of craft courses who wish to further their training and the majority of secondary school leavers will join ordinary Diploma programmes lasting 2 to 3 years and which will dominate the middle colleges. The ordinary diploma courses may further their training by joining Higher Diploma or Technologist courses in National Polytechnics or in the Moi Technological University for a duration of not less than 4 years.

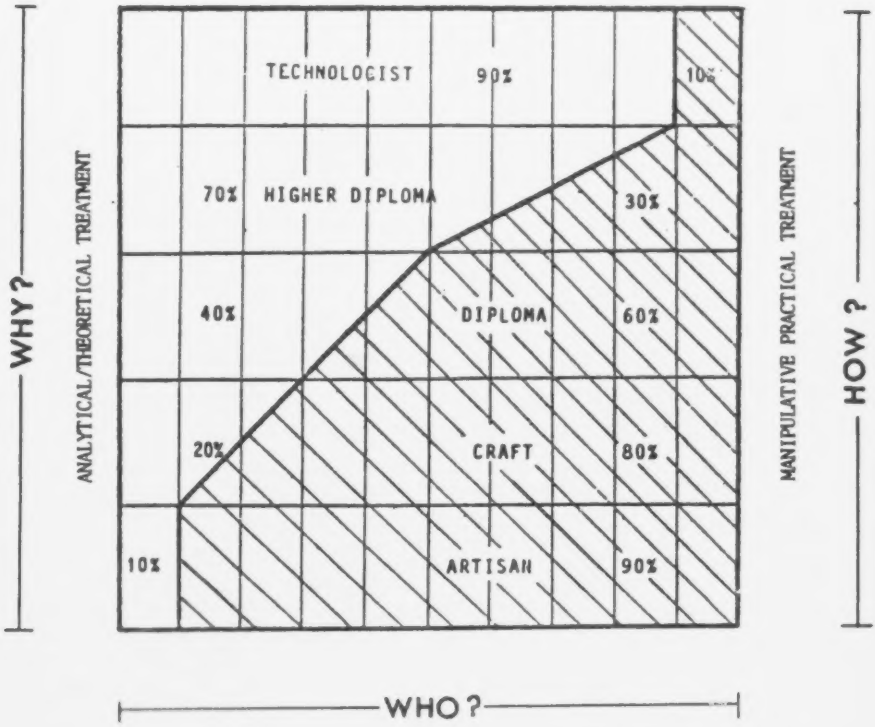
All the new curricula is to be restructured so that linkages are created to enable students to transfer from one programme to another where necessary through a credit granting system. Students who leave secondary schooling for one reason or another can be admitted into training institutions at an appropriate level for a programme of his or her choice and ability without loss of time.

Figure III entitled manpower training system shows the depth of theoretical versus practical treatment of each level of technical education and vocational training programme while figure IV on curriculum design and development for Technical Programmes shows the depth of decision-making or levels of responsibility associated with each level of technical education and vocational training.

The short courses last 12 months and the long courses last 24 months. The attendance pattern is flexible to cater for part-time, full-time, evening, block release or sandwich arrangements.

MANPOWER TRAINING SYSTEM

FIG. III



SHOWS : i) harmonization, rationalisation and linkages in the training programmes ;

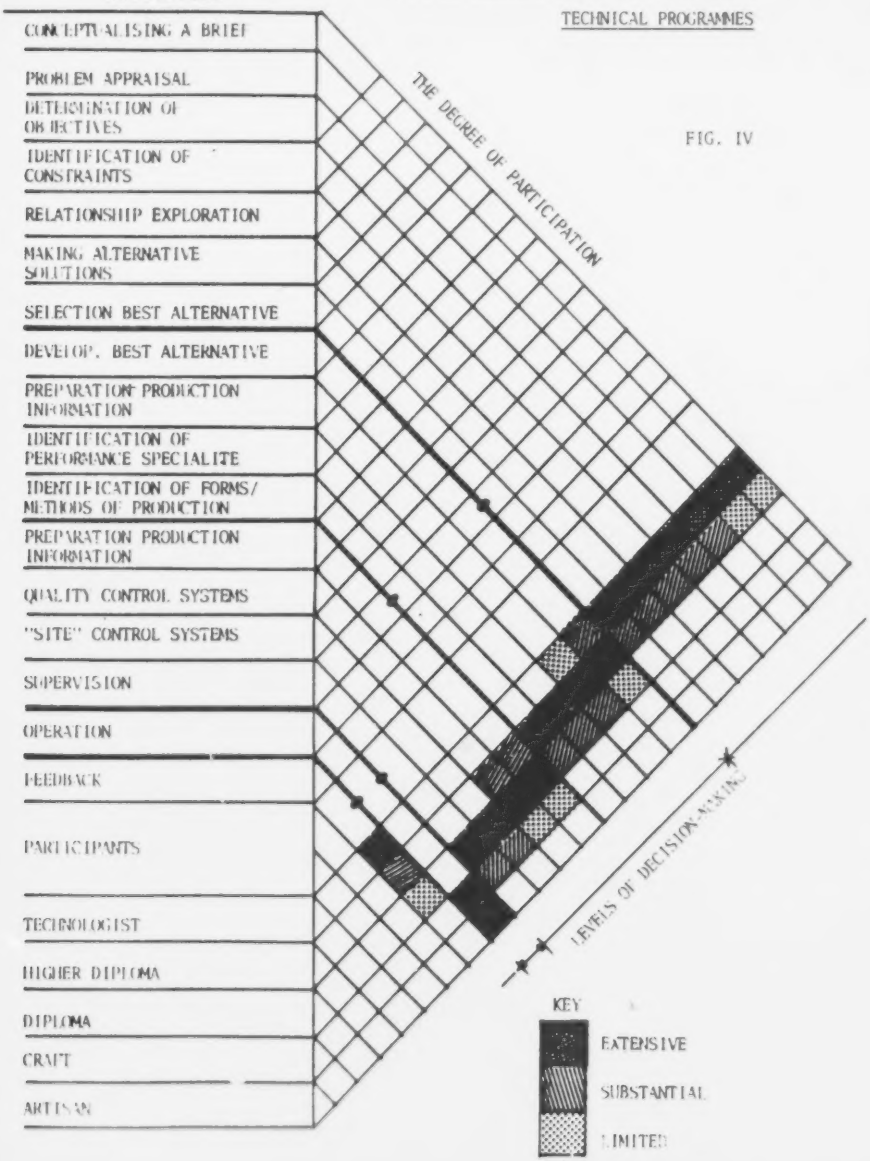
ii) the depth of theoretical/practical treatment in each programme.

iii) ☐ analytical/theoretical treatment ;

iv) ▨ manipulative practical treatment.

CURRICULUM DESIGN AND DEVELOPMENT FOR TECHNICAL PROGRAMMES

FIG. IV



D. DETAILED CURRICULUM ANALYSIS OF TECHNICAL EDUCATION AND VOCATIONAL TRAINING PROGRAMMES IN THE 8-4-4 SYSTEM OF EDUCATION

1. TRAINING FOR PRIMARY SCHOOL LEAVERS

This training will consist of the following three types of programmes at certificate level :

a) Proficiency skills certificate
b) Artisan skills certificate
c) Craftsmen skills certificate

The programmes will be in different courses specialisations but the depth and breadth of each course will be almost the same. The courses will be mainly technical and community based areas of study.

GENERAL OBJECTIVES OF CERTIFICATE PROGRAMMES

a) To provide training skills to primary school leavers of all ages.
b) To provide an avenue for life long education through continous up-grading of skills.
c) To provide vocational training which is directly linked to occupational competence for employment or self employment both in rural and urban areas.
d) To instil in the trainee an appreciation and dignity of manual work.
e) To develop entrepreneural skills
f) To develop relevant practical skills which lead directly to making valuable articles for income generating purposes.
g) To appreciate the significance of team work and co-operation in performing productive activities.
h) To provide a foundation for further training in relevant trade or occupations.

PROFICIENCY SKILLS CERTIFICATE COURSES

These consist of short courses, designed to meet short-term training demands. The training programmes are mostly practical with trainees spending nearly 100 per cent of their time performing practical tasks. The curriculum is tailor-made or is based on a particular community profiles. The ultimate goal of these programmes are to enable the trainee participate in income earning tasks through self-employment or wage employment especially in the non-formal sectors of the economy. In otherwords, these courses are part of extension services offered to potential or existing small-scale entrepreneurs.

The training duration ranges from one month skill upgrading to three, six or twelve months. The attendance pattern is flexible to cater for part-time, evening, block release or sandwich arrangements.

Some of the areas of study at the level of training include :

i.	Poultry keeping	iv.	Machinists
ii.	Retail shop selling	v.	Plumbing
iii.	Dressmaking	vi.	Vehicle servicing

ARTISAN SKILLS CERTIFICATE COURSE

These courses are intended to equip the trainees with useful vocational skills to enable them to perform routine tasks. The artisan receives assignements from a supervisor or craftsman who gives simpler instructions and makes clarifications or suggestions when necessary as work is performed. The purpose of these programmes is to enable the trainee to undertake activities which can earn him a living in the society.

The curriculum comprises 90 per cent of the time to be spent on acquisition of learning practical skills in a given trade and 10 per cent on related theoretical subjects such as General studies and Mathematics.

The short courses last 12 months and the long courses last 24 months. The attendance pattern is flexible to cater for part-time,full-time, evening, block release or sandwich arrangments.

Some of the study areas at this level include:

i) Carpentry and Joinery
ii) Masonry
iii) General fitter
iv) Clerk typist
v) Storekeeping
vi) Salesmanship
vii) Tailoring
viii) Food Production and Service
ix) Plumbing
x) Leather work
xi) Agricultural mechanics
xii) General Agriculture
xiii) Motor Vehicle Mechanics
xiv) Electrical installation
xv) Welding and Fabrication
xvi) Painting and Decoration

CRAFTSMAN CERTIFICATE COURSES

These courses are aimed at producing a person who can perform manipulative skills to an existing and consistent standard or specification with utmost efficiency and speed. The curriculum should enable him to acquire adequate practical skills plus an understanding of relevant science, mathematics, technical drawing, and technology in addition to basic decision-making know-how. The curriculum consists of 80 per cent practical skill acquisition and 20 per cent theoretical learning. The courses are to be of 2 to 3 years training duration but the attendance pattern will be flexible as for the artisan courses. Admission to these courses is open to secondary school leavers whos qualification is not very high and to holders of artisan certificates. Some of the study areas at this level include :

i) Mechanical Engineering
ii) Electrical Installation
iii) Motor vehicle mechanics
iv) Electronics
v) Accounting
vii) Storekeeping
ix) Masonry
x) Agricultural mechanics
xi) Welding and Fabrication
xii) Carpentry and Joinery
xiii) Plumbing
xviv) Garment Manufacture

2. TRAINING FOR SECONDARY LEAVERS

DIPLOMA COURSES

The curriculum for the diploma courses will be broad based in content to provide the trainee with technical education and training skills which are responsive and relevant to Kenyan manpower requirements at the middle level. These courses will offer an attractive avenue of tertiairy education to those who do not get a chance to join the university or to those who will have completed craft certificate courses. The 1985 cohort of pupils in standard 8 class will enter secondary school in 1986 and sit for their final examinations in 1989 and thereafter enter post-secondary training institutions in 1990.

The curriculum will be planned such that 60 per cent of the learning time will be spent on acquisition of practical skills while 40 per cent of the time will be spent on theoretical studies. The duration will be designed to last 2 to 3 years and to allow a flexible attendance.

Some of the areas of study at this level will include :

i)	Mechanical Engineering	ix)	Radio and Television
ii)	Automotive Engineering	x)	Banking
iii)	Refrigeration	xi)	Telecomunication
iv)	Computer Science	xii)	Meat Technology
v)	Water Engineering	xiii)	Farm Power and Machinery
vi)	Cartography	xiv)	Institutional Management
vii)	Surveying	xv)	Hotel Catering Services
viii)	Building maintenance	xvi)	Personnel Managment

HIGHER DIPLOMA/TECHNOLOGIST COURSES

The courses will be open to those who will have completed 2 to 3 years of relevant diploma. The curriculum for these courses will be designed to produce a person who is qualified by education and training plus industrial

experience to carry out professional services or apply scientific principles in solving management problems. The courses at this level are expected to produce a practical oriented person who can enter into direct employment or self-employment without addtional training at the place of work.

The curriculum will be designed such that 30-10 per cent of the training time is spent on acquisition of practical skills while 70-90 per cent of the time will be spent on theoretical/analytical studies. The duration of training is expected to last 2 to 3 years and will include part-time, block-release, sandwich, and full-time attendances.

Some of the areas of study at this level will include :

i) Mechanical Engineering Production
ii) Mechanical Engineering (Textiles)
iii) Mechanical Engineering (Plant maintenance)
iv) Electronic Engineering
v) Civil Engineering
vi) Electrical Engineering
vii) Agricultural Engineering
viii) Food Technology
ix) Water Engineering
x) Computer Science
xi) Transport Management
xii) Public Relations
xiii) Public Finance
xv) Financial Management
xvi) Banking
xvii) Organisation and Methods

3. IMPLEMENTATION OF THE NEW VOCATIONAL AND TECHNICAL EDUCATION CURRICULUM AND ITS IMPLICATION ON PRODUCTIVE WORK

The long term aim will be to design modular (unit based) type of curricula which can be adopted to programmed learning, correspondence studies

or flexible attendance pattern. The training curricula will comprise of a given number of phase-tests of practical projects which an individual student will have to complete before proceeding from a lower stage to a higher stage.

Every institution will be encouraged to establish a production unit. The production units will serve the following purposes:

a) To provide a facility which can be used to expose trainees to real industrial work situation or practical experience within the proximity of the training institution.

b) To produce valuable articles or services which can be sold to earn the institution some revenue to enable it to be self-reliant or self-supporting. The production unit should be able to operate commercially such that it is able to compete effectively with other commercial firms in the local areas in soliciting for contract work to schools, co-operative societies and government institutions.

c) The revenue form the proceeds of the production unit should help to subsidise the fees paid by trainees who provide it with services in terms of labour and professional services.

It has already been mentioned in Part III Paragraph B that the 4-year curriculum which was introduced in technical secondary schools in 1970 was academic-based and emphasised examination performance. This curriculum did not prepare students adequately for direct wage or self-employment. It is because of this reason that the Government of Kenya decided to phase-out this 4-year curriculum and replace it with a training-based curriculum. In January 1986, the 19 technical secondary schools will not admit Form 1 students. Instead these schools will admit students for a two-year artisan certificate courses. The trainee who completes the two-year course successfully will continue with a new training-based programme leading to 2 to 3 years of craft certificate courses.

In 1990, secondary school leavers will be admitted into these 19 institutions for the new diploma courses. The school leavers will consist

of the first cohort of 8:4:4 system of education who joined standard 8 in 1985. 1989 therefore will be the last year when the academic-based curriculum in technical secondary schools will be taught. However, a recent survey of the physical facilities in these institutions has established that :

a) the available facilities would not be adequate for the post-secondary training programmes. Additional equipment will be required. Rennovation and improvement of buildings will be needed :

c) available teachers are not adequately qualified to hand post-secondary training programmes.

The artisan certificate courses will feature prominently in youth polytechnics, community training centres and in national yout service training centres. These institutions will however require better qualified teachers and additional equipment.

The craft certificate and diploma courses will feature more in Harambee institutes of technology, privately owned training colleges, individual Government Ministries, and in colleges of religious and charitable organisations. On the other hand, the Diploma and Higher Diploma/Technologist courses will be mainly offered in National Polytechnics and in the training institutions managed by various Government Ministries and Parastatals.

E. TYPES AND ORGANISATION OF PRODUCTIVE WORK PROGRAMMES IN K E N Y A

This chapter will cover in general terms a variety of productive programmes as well as selected case studies representing different types of productive work programmes existing in Kenya. However, before discussing any types of programmes, it will be necessary to highlight the features and provisions of Kenya's apprenticeship law since a good number of participants in these programmes work under the apprenticeship scheme.

APPRENTICESHIP LAW

The apprenticeship law as it existis in Kenya is contained in the Industrial Training. Act Cap. 237, Laws of Kenya. The 1979 edition gives the following definitions related to apprenticeship :

a) "apprentice" means a person who is bound by a written contract to serve an employer for a determined period of not less than four years, or such lesser period as the National Industrial Training Council shall determine with a view to acquiring knowledge, including theory and practice, of a trade in which the employer is reciprocally bound to instruct that person;

b) "indentured learner" means a person, other than an apprentice, who is bound by a written contract to serve an employer for a determined period of less than four years with a view to acquiring knowledge of a trade in which the employer is reciprocally bound to instruct that person ;

c) "minor" means a person under the age of 15 years ;

d) "surrender" means a schemme made to regulate the training of apprentices or indentured learners in any given trade as per the Act ;

e) "trade" means a skilled occupation.

Section 8 of the Industrial-Training Act defines a person who may bind himself as an apprentice or indentured learner in any trade of occupation as any person who :

a) has attained the apparent age of 15 years ; and
b) has completed any period of compulsory education required by law; and
c) has, in the case of a trade or occupation in respect of which a scheme has been made, the qualifications prescribed under that scheme ;
d) has been certified medically fit by a medical practitioner as provided by Section 10 of the Act.

This section further states that a minor shall not bind himself as an apprentice or indentured learner except with the consent of his parent or guardian, with the consent of a District Officer or Labour Officer. A minor with such consent shall be bound by the contract throughout ist currency notwithstanding that he may have in the meantime attained his majority. During the contract the law prohibits any conditions relating to payment of wages to an apprentice or indentured learner based upon the quantity of work done or working overtime for persons under 17 years of age. However, on satisfactory completion of the contract, the employer is required, at the request of the apprentice or indentured learner to make out a certificate of apprenticeship or indentured learnership.

Some of the training schemes under the Industrial Training Act cover the following industries :

- Building and Civil Engineering
- Motor Engineering and Transport
- Printing, Publishing and kindred and allied industries
- General Engineering and Metal Manufacturing
- Power and Telecommunication
- Sawmilling, Timber and furniture
- Textile
- Chemicals, cement and pharmaceuticals
- Food processing
- Plantation

1. AN OVERVIEW OF PRODUCTIVE PROGRAMMES

Alongside the formal and informal vocational and technical education programmes, there exists a number of productive programmes which range from artisan to technician skill requirements. The National Youth Service training scheme with its 7 training centres spread throughout the country offeres a good example of productive programmes, based mainly on artisan and craft skills.

The National Youth Service which was started by the Government of Kenya in 1964 is the largest single scheme that offers training opportunities for young people, the majority of whom are primary school leavers. The objectives of the service is to train people to acquire skills useful to themselves and the community. Once recruited into the service, the boys are sent for a three months induction course at Gilgil, 60 km from Nairobi while the girls undergo a similar training at the nearby Naivasha. After the initial training the servicemen and servicewomen are engaged on non-paying national work for about a year including such activities as the building of roads, bridges, canals, air-fields, working on public farms, starting new public farms, and clearing bushes as part of the anti-malaria campaign. On completion of this course, they are selected into various training programmes within the National Youth Service centres.

The small scale industrial development programme sponsored by the Kenya Industrial Estates (KIE) is another example of productive programmes which can be classified under the non-formal categories of vocational and technical education.

The focus of training is on imparting business management know-how to the small scale industrialists in urban and rural areas.

Short-tailor-made courses are organised in various districts throughout the country designed to meet the different needs of various industries. The objectives of this small-scale development programmes are :

a) To provide management training for small sized business enterprises in the country.

b) To provide management extension and advisory services to entrepreneurs of small scale businesse in urban and rural areas.

c) To provide research and information services to small scale industrial entrepreneurs.

d) To assist small businessmen both technically and financially in introducing simple business methods and techniques, systems and controls. The assistance is provided in form of cheaply rented premises, and capital to buy equipment and tools. The industrialists only contribute working capital which constitutes about 15 per cent of the total capital outlay. Therefore, the Kenya Industrial Estates LTD provides an avenue for trained craftsmens and technicians to engage in self-employment or in wage employment.

This programme is implemented through three levels of operation, i.e. Industrial estates which are situated one in each of the 8 Provinces in the country, rural industrial development centres, one in district headquarters and in less developed areas, the industrial promotion areas. There are currently a total of 20 estates and centres. These levels are developed as follows:

- An industrial estate, which is usually located close to a large town (usually provincial headquarter) comprises an Administration block, a number of factory premises and a technical services centre, where technical assistance is made available to the operating industries.

- Industrial promotion areas which are usually located in less developed areas comprises a cluster of low cost sheds housing small industrial projects which are closely related to the needs of the area.

- A rural industrial development centre which is usually located near a smaller town (usually district headquarter) comprises an Administration block and small factory units, together with a technical service centre or workshops.

The entrepreneurs rent the factories from the K.I.E. and with the assistance of K.I.E. loans, 85 per cent of total capital, set up manufacturing units or produce and market products for the local market and in some cases, for export.

Each of the estates or centres is staffed by a core of professional staff, consisting primarily or economists, accountants and engineers, backed by clerical, technical and other service personnel. The project officers identify new entrepreneurs and improve the efficiency of existing entrepreneurs through short training courses. Extension officers act as consultants, advisers and as trainers of entrepreneurs in co-operation with institutions such as Kenya Institute of Business Training and the Kenya Industrial Training Institute.

Specifically, K.I.E. assists new and upcoming industrial entrepreneurs in the following ways :

a) Planning and appraisal of industrial projects.
b) Provision of industrial premises at subsidised rent rates.
c) Provision of finance by giving loans.
d) Assistance during implementation of projects.
e) Provision of repair and tool manufacture facilities at its technical services centres set up in each industrial estate and rural industrial development centre.
f) Provision of extension services on Management, Technical, Marketing and bookkeeping problems through consultancy service provided by resource personnel.

When K.I.E. first started operating in 1978, the basis of assistance for entrepreneurs consisted of the provision of a factory at subsidised rental plus a loan of up to a maximum of 85 per cent of the total capital requirement, at a low rate of interest. It also gave legal assistance towards commissioning and installing machinery for the purpose of production. The K.I.E. assumed that an abundant supply of potential entrepreneurs would immediately approach it with business ideas ready to transfer their Managerial ability to the Mana-

gement of business. Later, K.I.E. realised that this assumption was wrong because there had been no previous tradition of entrepreneurship, least of all in the rural areas of the country. K.I.E. realised that training was required. Prospects for establishing small businesses in Kenya do not only entail setting up entrepreneurs in business, but also involve setting them up where they are most needed and most desirable. The biggest problem is not the promotion or development in the big cities and urban towns; but development in the small rural towns and opening up remote areas of the country. The vast majority of those who have entrepreneur ability are non-starters because they lack the opportunity of being trained in the relevant business techniques and skills, and without such training, talents will remain dormant and the potential for contributing to economic development would remain under-utilised while unemployment continues to rise around them. It is for this reason that K.I.E. is providing entrepreneurs with training through seminars in finance, management and marketing.

2. PROJECT WORK IN TECHNICAL SECONDARY SCHOOLS AND INDUSTRIAL EDUCATION SCHOOLS

Project work whether for technical education or industrial education is a useful tool in the teaching of practical subjects. It is intended to assist the learner to be able to :

a) Support, broaden and supplement his learning experiences.
b) Develop a co-operative attitude of responsibility towards others.
c) Display more realistic profils of learning abilities and qualities.
d) Display his personal qualities such as leadership and willingness to work.
e) Develop his power of communication.
f) Display individual initiative and show genuine personal effort.

In the technical education system, project work is used extensively. The type of work done by the trainees is varied due to a number of factors:

these being the nature of the course and its level, material costs and the potential of the project for performance measurement.

Technical discipline as taught in our institutions are extremely varied covering many of the vocational trade areas. In the majority of these a single physical object or a number of objects can be made by the trainee. The quality of the project is then assessed using a marking schedule in order to measure the skill level of the individual. The type of projects made range from useful articles such as stools, tables, spanners, cupboards, chairs and machines to the non-functional end tests such as masonry walls, stepped shafts and single joints which are assessed then destroyed. They may also include designing any of the above items including parts of a building.

A different type of test is that where psyco-motor skill is measured through observation by an external examiner i.e. Motor vehicle engine timing or the testing of an electrical circuit. Obviously, in these cases nothing physical is produced and the training cost is minimal, it is however restricted to certain individual trades.

The application of project work and its use for examination purposes is dependant upon the individual course regulations.

For example, the current technical school pupils are externally assessed on course work and awarded an 'O' level grade on their level of performance. To achieve this they produce on average six projects known as 'phase tests' over a two year periode, i.e. terms 3 and 4.

The industrial Education pupils complete a major project which can take up to one term and its value for examination purposes amounts to 50 % of the final examination marks.

In the higher level courses, more complex projects are made. These however, rarely account for more than 30 % of the final examination marks.

The organisation and administration coursework is done at different levels and the bodies involved include the Kenya National Examinations Council (KNEC) which set and assess projects, the Inspectorate of the Ministry of Education, Science and Technology and various post-secondary institution which monitor ongoing coursework ensuring marks are submitted for grading purposes.

At secondary or post-primary level the project work is the K.N.E.C.'s responsability. However, at post-secondary course level, project work is controlled by the institution concerned, although it can be externally assessed by examiners appointed by the K.N.E.C.

Projects are vary costly, these range from Ksh.1 to over Kshs. 190 per unit and are met by the Grants ain Aid, given bu the Ministry of Education, Science and Technology. Materials are supplied from K.N.E.C. and charged to pupils/students depending upon the course. At the present time few if any of the course projects are sold although where pupils contribute to the to the cost (in industrial Education) they are permitted to retain the project after assessment.

In conclusion, it is important to state that a great deal of care should be taken to find a balance between project and production work. Whilst production work can have obvious financial benefits to both the trainee and the institution, it can also create a number of problems. For example, too much emphasis on production work will be at the expense of the variety of skills taught to the trainee. Furthermore, where trainees are used prematurely, expensive mistakes can result with an additional loss of credibility to the institution.

It is also important to note that the national polytechnics and the technical secondary schools when they become converted into technical training schools will introduce production work at the commercial level in the same way as the Harambee Institutes of Technology and Youth Polytechnics are currently doing.

3. CASE STUDY NUMBER ONE

KIRINYAGA TECHNICAL INSTITUTE

Kirinyaga Technical Institute is the only Harambee Institute of Technology in Kirinyaga Distric. This institute is situated at the junction of Sagana Embu and Sagana Kerugoya Roads, approximately 100 km from Nairobi.

Kirinyaga Technical Institute opened its doors to students in 1977. It occupies a piece of land measuring approximately 250 acres and has a total enrolment of 310 students who are boarders. It offers Clothing Technology and Building construction courses.

Some useful statistical data about this institute is outlined below :

a) ENROLMENT PER COURSE

Course	number of students
Clothing Technology (3 year course)	106
Building construction (3 year course)	204
Total	310

b) STAFF

Category	number
Teaching	26
Non-teaching	30

c) INSTITUTIONAL FARM UTILISATION

Type of farming	cultivated land
Citrus fruits	10 acres
Mature coffee	60 acres
Maize	20 acres
Horticultural crops	4 acres

Learning in this institute consists of 70-80 per cent practical work and 20-30 per cent of theory and analysis. Models and simulated situations are used to facilitate learning to beginners classes.

The Productive Programmes in this institute consist of :

a) Construction
b) Carpentry Production Unit
c) Tailoring Workshop
d) Institute farm

All the above programmes except the farm started operating on commercial basis in January, 1984. The farm is the oldest and started operation on commercial basis in 1974.

CONSTRUCTION FIRM

This programme consists of a staff of 10 employees working under a project manager. These employees were former trainees of the institute. This firm bids for tenders offered in the district. It has built a secondary school library and classrooms and a bible school for Kshs. 540.000/= .

For the institute it has build the following :

i) Electrical workshop
ii) Plumbing workshop
iii) 11 staff houses = Grade D
iv) Coffee factory

The total value of contracts undertaken by this firm in 1985 amount to approximately Kshs. 3.000.000/= . The profit margin for projects taken by this firm is 7-10 per cent. This programme is becoming fairly attractive for schools, co-operative societies and government institutions because of its low charges.

CARPENTRY PRODUCTION UNIT

This programme consists of a staff of 4 employees and a supervisor, all of whom were trainees of the institute. This unit in 1985 won tenders to supply furniture to one financial institution, a religious community centre, and one hotel all in the local district. The total value of contracts for furniture supply in 1985 is Kshs. 560.000/= . The net profit margin for the projects carried under this programmes is 5 per cent.

This programme has not attracted many customers because the ordinary members of the community are generally poor and cannot afford to buy the high quality furniture made at the institute, although the prices are relatively low. The institute is planning to look for a market for its furniture in Nairobi.

The raw materials for furniture is cheaply obtained from the locality.

TAILORING WORKSHOP

This programme has 12 employees and a manager. It deals mainly with supplies of uniform to schools and co-operative societies. In 1985, it had orders for over KShs. 880.000/= and it is very popular with local community because its products are comparatively cheap. The local administration has promised to offer all tenders for supply of uniform to Government Institutions in the District to this institute. The profit margin is about 16.6 per cent.

INSTITUTE FARM

This is the oldest and largest programme at the institute. The Trustees of the institute wanted the farm to be run by students as a source of income to raise proceeds and thus subsidize and sustain running costs. The income from this farm is supposed to purchase tools to leaving students. The trustees wanted to avoid seeking for financial contributions from the public for recurrent expenditure. Students have their own clubs and each club has a piece of land where they cultivate crops for sales to the institute. In

1985, one club sold vegetables worth KShs. 8.000/= to the institute. In addition, students harvest coffee, weigh it and they are paid for the labour contributed. A total revenue of KShs. 1.500.000/= is made each year.

BENEFITS OF THE KIRINYAGA TECHNICAL INSTITUTE'S PRODUCTIVE WORK PROGRAMMES

The projects carried out under the 4 programmes in this institute have a number of advantages :

1. The projects act as a learning facility to expose trainees to real world of work in the various trades offered in the institute.

   Trainees do their practical attachment by participanting in the commercial projects undertaken either by the construction firm, carpentry production unit and the Tailoring workshop. In the absence of such projects, it would have been difficult to organize practical attachment to students of this institute since it is situated in a rural area where there are large industries for such an attachment.

2. The projects are useful in the sense to generate income which is used to subsidize the running costs. These projects are therefore meant to make the institute self-reliant.

3. The trainees who participate in these projects have too advantages :

   a) The proceeds from the farm are used to buy them tools to take away when they graduate.
   b) The income from the other projects is shared between the institute and the trainees. The portion of the income for the trainees is used to pay part of the fees. Consequently the final fees paid by the trainee at present is only KShs. 3.900/= per year. Fees in similar institutions in Kenya which do not have this type of productive programmes ranges between KShs. 4.500/= and Ksh. 6.000/= per year.

4. The institute has employed more than 30 former trainees in the projects. Thus the projects have helped to create employment opportunities.

PROBLEMS EXPERIENCED AT THE INSTITUTE

The institute requires personnel and equipment to enable it to perform the following tasks which would enable it to achieve more in its productive work programmes.

a) Facilities and personnel to research on quality control and production techniques
b) Facilities and personnel for market research and marketing of its products and services
c) Maintenance services for its equipment
d) Food processing equipment for its farm products especially the perishable ones.

4. CASE STUDY NUMBER TWO

KIMATHI INSTITUTE OF TECHNOLOGY

This institute is located in Nyeri District of Central Province. It started operating in 1981 and has a total enrolment of 296 students comprising the following :

COURSE	number of students		
	1st year	2nd year	total
Masonry	23	24	47
Carpentry	23	22	45
Plumbing	22	21	43
BUSINESS STUDIES			
CPA 1 Sec. 2	31	-	31
CPA 1 Sec. 1	32	-	32
ACNC	98	-	98
	Grand total		296

PRODUCTION WORK

1. After 3 terms of a six term (2 year) course, plumbing students go for a 3 months practical attachment work in institutions which are situated within the locality which include :

   a. Mt. Kenya Bottlers LTD
   b. Nyeri Municipal Council
   c. Ministry of Works, Housing and Physical Planning - Central Province

   During the practical attachment, students perform a wide variety of practical work just like full-time employees. The purpose of this attachment is to expose the students to the real work situations. The students are not paid any money for the work they perform while on attachment: instead the institute is responsible for the financial

requirements of the students. The institute's instructors supervise the attachement but are assisted on day to day activities by the officers in charge in the institutions where the students are attached. Often,the students who complete their part III of plumbing get employmant in the institutions where they did their practical attachment. While at the institute, the students :

1. participate, performing plumbing tasks during the construction of classrooms, workshops and dormitories. Details of this will be given later.

2. The institute has a large farm of over 4 acres where it grows coffee, and rears livestock in an effort to make it self-sustaining financially.

3. Students who do masonry and carpentry do not undertake practical attachment outside the institute. Instead, they make learning models such as those of furniture, parts of buildings and whole buildings and undertake projects within the institute such as construction of classrooms, dormitories, workshops under the supervision of a project manager and institute's instructors. To date, students have completed the following projects :

   a. Construction of permanent 6 classrooms each capable of accommodating 24 students at a rate of 2 classrooms each year.

   b. Construction of 2 large permanent masonry workshops, measuring approximately 200 ft. x 40 ft. at a rate of one workshop each year.

   c. Construction of one large permanent dormitory with double-bed cubicles for 48 students. Plumbing students take part in the construction of these buildings. Carpentry students have started to make furniture for sale. The institute is planning to compete for contracts for supply of furniture and construction services.

The savings made through this programme helped to reduce the amount of fees paid by students. The fees charged by this institute is approximately 4.000/= per year which is about 2.000/= lower than what is charged by those institutes of technology which do not have any productive programmes.

It is important to note that students of business studies courses do not engage in productive work. When the students in the Masonry, Carpentry and Plumning courses undertake commercial contracts, the business studies students could easily be involved in Market Surveying, Marketing, actual selling of products and services as well as maintaining accounts records.

PRODUCTIVE WORK PROGRAMMES IN OTHER HARAMBEE INSTITUTES OF TECHNOLOGY

The 15 Harambee Institutes of Technology have achieved different degrees of development in their productive work programmes. These institutes are also at different stages of development as outlined below :

1. Institutes which have developed to their planned capacity.

   a. Kiambu Institute of Science and Technology
   b. Rift Valley Institute of Science and Technology
   c. Muranga College of Technology
   d. Sangalo Institute of Science and Technology
   e. Kirinyaga Technical Institute
   f. Kaimosi Friends College

Of these, Rift Valle Institute of Technology has the largest area and biggest enrolment. All these institutes except Kaimosi Friends College have a large farm and a production unit mainly engaged in building construction and which is operating commercially within the locality. In 1979, Kiambu Institute of Science and Technology had annual income of Kshs. 566.440/= from its workshop production.

The main productive work projects include :

a. Coffee Farm occupying about 35 hectares
b. Carpentry production unit
c. Construction Firm
d. Appropriate Technology production unit

2. INSTITUTES WHICH ARE NEARLY DEVELOPED TO THEIR PLANNED CAPACITY

a. Kimathi Institute of Technology
b. Western College of Arts and Applied Sciences
c. Ramogi Institute of Advanced Technology

The production units in these institutes are at their formation stage and have therefore not started operating commercially. Kimathi Institute of Science and Technology is the only one with a large farm in this category of institutes.

3. INSTITUTES WHICH ARE JUST DEVELOPING

a. Coast Institute of Technology
b. Gusii Institute of Technology
c. Ukamba Agricultural Institute
d. Meru Institute of Technology
e. Moi Institute of Technology

Production work programmes have not yet started operation.

4. INSTITUTES WHOSE PREMISES ARE UNDER CONSTRUCTION

Embu College of Technology

5. PRODUCTIVE WORK PROGRAMMES IN YOUTH POLYTECHNICS AND COMMUNITY CRAFT TRAINING CENTRES

It has already been said that the Youth Polytechnics and community Craft Training Centres were established to train primary school leavers throughout the country in basic vocational skills so that they can perform useful, preductive work for remuneration in the local community. In addition, to giving courses in the conventional areas of carpentry, masonry and tailoring, these institutions often attempt to create new local industries by offering instruction in new lines such as cloth printing, bee-keeping or bread-making. They have encouraged their graduates to form co-operative societies for construction of cheap permanent and semi-permanent buidlings including class-rooms for the local schools as well as supplying furniture for schools and governmental offices.

Some of the institutions which have successfully encouraged their graduates to set up local industries or to form a co-operative societies which compete for contracts on commercial basis include the following :

	NAME	DISTRICT
1.	Maseno Youth Polytechnic	Kisumu
2.	Kianjai Youth Polytechnic	Meru
3.	Karatina Youth Polytechnic	Nyeri
4.	YMCA Craft Training Centre	Nairobi
5.	Christian Industrial Training Centre	Mombasa

The degree of success of a particular institutions no doubt depends very much on local leadership and local conditions.

For example, in 1979, the christian Industrial Training Centre - Nairobi made an annual earning of KShs. 80.000/= from sales of products, less cost of materials and engaged labour, and 15 per cent of its total expenditure on equipement. Production ranges from wheelchairs and furniture to solar water heaters and windmills. In addition, almost all the building extensions at the centre have been carried out by students. This centre together with 3 other similar centres offer good examples of cost-cutting and revenue-earning ingenuity in action.

6. CASE STUDY NUMBER THREE

TOOLS MAKING PROJECT

One of the biggest problems experienced in introducing and expanding craft and technician courses is the high cost of acquiring the necessary equipment and tools which are normally imported. The cost of maintaining and replacing thesetwo items especially with the high inflation experienced in the devoping countries has proved a considerable handicap. The importation of these items creates a drain on the meagre foreign exchange resources.

The importance of good, well maintained tools and an ability to handle them, greatly enhances the craftsman's skills and his productive capacity. An ability to make his own tools is of a great advantage to a craftsman as in producing such tools, a craftsman develops intimate attachment to them, increases his precision skills, and more importantly, produces them to fit his hands and conditions of production. The ability to produce one's tools is particularly important to the rural craftsman as it removes his having to depend on factory-made implements, while allowing for savings. From the economics point of view, making tools locally would not only save foreign reserve, but would also reduce he dependence on foreign-manufactured implements.

The need to have tools made locally is partly being answered by the ongoing tool-making project, which has been in operation in Youth Polytechnics since mid 1983 *.

PROJECT GOALS OF YOUTH POLYTECHNIC TOOLS - MAKING PROJECT

Despite continued supply of tools to Youth Polytechnics by both the Government and NGOs, they have not yet reached a point of self-sufficiency in this area. After training, each trainee is expected to receive a complete tool-kit from the Youth Polytechnic in order to assist him to get started as

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* Action Aid-Kenya - The Tools Making Project 1983/84 Report : Nairobi, April 1985.

a producer. This goal has however not been achieved mainly due to shortage of resources experienced by these institutions. In 1983 the NGOs decided to carry-out a project for training instructors in Youth Polytechnics in the art of tool-making as a long-term solution to the problem of insufficiency of tools facing these institutions year after year. The project was headed with Action Aid as the implementing agency. Financial contributions were initially made available by the Danish Volunteer Service which provided a trainer, CARE-Kenya which provided a vehicle and a motor-cycle for the trainers and Action Aid which underwrote the recurrent expenditure for the first few courses. Further funding has since been provided by the European Economic Community.

The courses are initially based on a set of manuals produced by ILO-SDSR. Encouragement is however given to instructors to come up with their modifications or new decisions. The new ones are adopted in succeeding courses. The models are continually updated and kept towards the completion of a manual which can be distributed widely.

TOOL-MAKING TRAINING COURSES

During the 1983/84 financial year, four courses were successfully organised and run covering 19 items of carpentry tools. The courses were run on a residential basis in the Youth Polytechnics. Each course admitted 10 carpentry instructors. The training duration of each course is 5 weeks at the end of which each participant completes a basic tool kit consisting of the following items :

1. Working Bench
2. Sash Clamps
3. Bench Vice
4. Bench Hook
5. Mitre Box
6. Marking Knife
7. Centre Finder
8. Bow saw
9. Coupling Saw
10. Hack Saw

11. Mallet
12. Window Remover
13. Jacket Plane
14. Rebate Plane
15. Plough Plane
16. Mortice Gauge
17. Bevel Square
18. Try Square
19. Bradawl
20. Wood Turning Lathe cum circular Saw

The raw materials used are obtained from the timbers available within the local areas. This is in keeping with the aim to encourage the use of locally available resources.

The last week of the course is spent testing the tool-kits by using the tools to make items of furniture in order to fully convince the participants that the tools do actually work as well as (and at times better than) the mass produced ones.

After the completion of the testing of the tools, a planning session is held. During the planning, each instructor makes a plan as to how he will dissemanate the skills acquired, particularly how he will organise the curriculum to include all the tools during the years that trainees take to go through the youth polytechnics. The last day of the course is a public occasion at which a highly placed government officer officiates the closure of the course. Members of the youth polytechnic management committees from the district where the course takes place, including chiefs and government officials and other opinion leaders are invited to view the tools and see the demonstrations at work. This occasion is used to spread the awareness among the members of the public that the tools-making skills exist in their area and to demonstrate the fact that by using locally available materials, more can be done to create a measure of self-sufficiency.

During the 1983/84 financial year, 42 instructors from the youth polytechnics (in six districts shown in the map on page 65 and one education officer from the Ministry of Education were trained. The Ministry of Education

sent in this officer to be trained with a view to testing the viability of introducing tools-making courses in primary schools and teacher training colleges. Discussions are going on within the Ministry to decide how best these courses can be organised.

Below are details regarding each of the 5 courses :

A. CARPENTRY TOOLS - MAKING COURSES

	COURSE	NUMBER OF INSTRUCTORS	NAMES OF YOUTH POLYTECHNICS WHERE INSTRUCTORS CAME FROM
1.	Pilot course June-July 1983	3	- Mangu - Ndunyu Chege - Kyuso C.R.C.
2.	1st course January-March 1984 at Mangu Polytechnic- Kiambu District	9	- Kirenga - Kirangari - Karatu - St. John Bosco - Nyandarua - Nderi - Thogoto - Nyaga
3.	2nd course April-May 1984 Ndunyu Chege Youth Polytechnic in Murang'a Distric	12	- Mangu - Kieni - Karuru - Kangare - Gatara - Kagundui-ini - Muyeka - Kanyuira - Makuyu - Muthithi - Kangema - Directorate of Basic Education
4.	3rd course July-August 1984 at Nkubu Youth Polytechnic in Meru District	11	- Githongo - Marimanti - Nkubu - Kirua - Ruibi - Maua

			- Muthara - Kianjai - Chuka - Kanyakine - Musa Nguruki
5.	4th course October-December 1984 Mogotio Youth Polytechnic in Baringo District	11	- Kituru - Baringo - Kabimoi - Ochii - Nginyang - Marigat - Mogotio - Subukia - Mai-Mahiu - Nakuru - Chepkorio

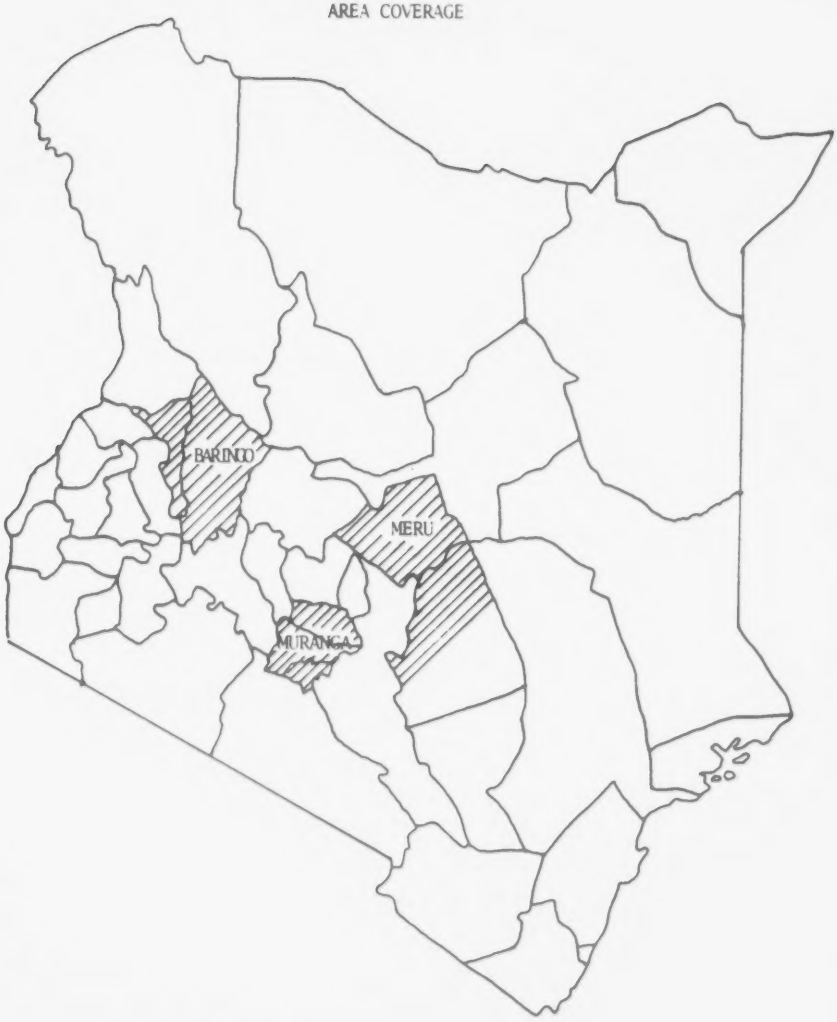
Metal-Work tools making courses

In the original proposal, it was anticipated that 20 metal work instructors would be trained in two courses each taking 10 instructors.

This was not possible as a trainer for metal-work was not found. Request have gone out to various volunteer services. It is anticipated that a trainer will be found before the end of 1985 and that the two courses will be held before the end of the year. The purpose of these courses is to spearhead the expansion of the training to include a wide range of implements from scrap metals.

TOOLS-MAKING PROJECT

AREA COVERAGE



B. TOOLS MAKING COURSE EXPENDITURE 1983 - 1984

The original recurrent costs were anticipated at KShs. 120.000/= for each metal-work course and KShs. 85.000/= for carpentry course. The actual cost for each carpentry course was an average.

LARGE SCALE IMPLEMENTATION OF TOOLS MAKING PROJECT

As at the end of February, 1985, 15 youth polytechnics had already set the process of including tools-making programme into their two year curriculum and were already implementing it. Another 7 polytechnics were in the process of including the programme in their curriculum; the reste experiencing difficulties such as shortage of funds, materials and being too busy fulfiling building contracts that youth polytechnics had undertaken.

Towards the end of 1985, a mid-term evaluation exercise was carried out to assess the usefulness and impact of these courses and to reshape the overall plans accordingly.

7. PRODUCTIVE WORK PROGRAMMES IN NATIONAL POLYTECHNICS

At present the three existing national polytechnics in Kenya have not seriously engaged in productive work programmes. The few productive work programmes found in these institutions are coincidental. Examples of these coincidental programmes are those found in the Graphic Arts Department and in the Institutional Management Department at Kenya Polytechnic.

The Graphic Arts Department prints all certificates issued by the college. It also prints , invitation cards, general forms, letterheads and envelopes as well as the prospectus of the institution. The services provided by this department constitute a significant cost-cutting contribution.

The institutional management Department operates a restaurant which is open to the senior staff and members of the public three days a week. It is well furnished and students prepare and serve three-course meals

at very low prices basically to meet the cost of cooking and raw-materials while the project provides real-life catering experiences for institutions management students, it provides a cheap service within close proximity to members of senior staff who could have otherwise travelled quite some distance to get the same service at higher costs. The revenue from this project again helps to cut-down on the operation expenses of offering institutional management courses.

The other departments of these institutions could easily start-off some revenue-earning and costs-cutting projects using the equipment and know how already available at the institutions.

F. 1. TRACER STUDIES ON TECHNICAL EDUCATION IN KENYA

It has already been stated in this paper that the aim of technical education is to provide a broad foundation of practical/technical skill and related theory, for further and specialized training after the completion of the course. The course is intended as a preparation for craft and technical courses.

The Directorate of Industrial Training, of the Ministry of Labour offers the largest training opportunity of graduates from Technical secondary schools for craft and technician apprenticeship courses. Those who undergo the craft and technician apprenticeship courses are absorbed in the private and Government sectors.

Training opportunities to these graduates are also offered by the following institutions :

i) Kenya Polytechnic
ii) Mombasa Polytechnic
iii) Kenya Science Teachers College
iv) Kenya Technical Teachers College
v) Kenya Railways
vi)) Metal Box Kenya Ltd.
vii) Kenya Canners Ltd.
viii) Kenya Power and Lighting
ix) Kenya Posts and Telecommunications

Below are two tables showing figures for technical schools graduates and the other showing figures for recruitement of these graduates for National Industrial Training centres through the Directorate of Industrial Training.

TECHNICAL SCHOOLS GRADUATES - YEARS 1976/1980

YEAR	1976	1977	1978	1979	1980
GRADUATES	1431	1525	1610	1799	1850

RECRUITMENT OF TRAINEES THROUGH DIRECTORATE OF INDUSTRIAL TRAINING
YEARS 1977 - 1980

TECHNICIAN APPRENTICES

SECTOR	1977	1978	1979	1980
1. Building and Civil Engineering	188	141	138	65
2. Plantation Industry	2	5	5	38
3. Printing, publishing and packing	-	2	1	4
4. General Engineering and Allied	4	8	4	142
5. Power and Communication	16	42	88	-
6. Saw milling, Timber and furniture	-	-	-	-
7. Food Processing	16	19	20	5
8. Chemical and mfr	-	2	5	8
9. Motor and Transport	20	15	49	75
10. Textile Industries	8	5	6	-
11. Commercial Distributive	-	-	-	-
12. Others	12	30	9	-
TOTAL	266	269	325	337
Percentage of total technical school graduates	18.6	17.6	20.2	18.7

Note : Entry to technician apprenticeships is based on academic performance. Consequently the above figures contain both academic and Technical school leavers.

CRAFT APPRENTICES

	SECTOR	1977	1978	1979	1980
1.	Building and Civil Engineering	94	150	116	113
2.	Plantation Industry	43	99	75	88
3.	Printing, publishing and packing	17	10	16	7
4.	General Engineering and Allied	89	52	64	157
5.	Power and Communication	30	31	50	-
6.	Sawmilling, Timber and furniture	1	-	10	10
7.	Food Processing	29	37	33	10
8.	Chemical and General mfr	20	22	28	13
9.	Motor and Transport	62	203	99	331
10.	Textile industries	22	37	7	9
11.	Commerciale distributive	-	-	-	-
12.	Others	12	77	69	29
	TOTAL	418	718	567	796
	Percentage of Technical School Graduates	29.2	47.0	35.2	44.2

NOTE: 1. Entry to Craft apprenticeships is normally restricted to Technical School leavers. However, a small percentage of (2%) those recruited do come from academic schools.

2. These figures do not include apprentices recruited outside of the Directorate's scheme, i.e. people recruited by industries with their own training schemes.

3. There is no official preference for technical school graduates in in admission to technician or craft apprenticeship courses.

SOURCES: 1982 PROJECT STATUS REPORT : Kenya-SIDA-Technical and Industrial Education Project-Republic of Kenya-Nairobi, February 1982.

RECRUITMENT OF TECHNICAL SCHOOL GRADUATES FOR DIT APPRENTICESHIP

YEAR	1981	1982	1983	1984
Technician	316	276	312	352
Craft	810	829	644	712
TOTAL Graduates	1.920	2.051	1.963	-
Percentage Recruited	58.6	53.9	48.7	-

From the above it is evident that about 50 per cent of the Technical School graduates find their way to craft and technician apprenticeship courses. However, as already stated theavailable infirmation is not very accurate because some of those admitted to the National Industrial Training Centres hold only academic qualifications while the figure of those graduates of Technical schools who are recruited for direct empoyment by private sector employers are not readily available; some of these graduates go on for further education of an academic kind in Form 5 and thereafter to the university.

The following studies carried on Technical education provide tracer study information on graduates of technical secondary schools :

1. Technical secondary school leavers and employment opportunities in Kenya by Daniel Sifuna, Kenyatta University College, Nairobi, 1982.
2. Technical Education section, Ministry of Education, 1974 Secondary Technical Schools Graduate follow-up study; summary of findings, August, 1975; and 1975 Technical Secondary School Graduate Follow-up study, summary of findings, October, 1976.
3. Occupational Transfer: Craft Training in Kenya : Comparative Review by Paul Bennet, 1984.
4. Dilemmas of Diversification; problems Associated with vocational Education in Developing countries; comparative Education by Kevin Lillis and Desmond Hogan, 1985.

The 1975 and 1976 tracer study of school leavers by the Technical Education section of the Ministry of Education suffered from very low response rates, i.e. 42 and 51 per cent respectively. These surveys were conducted only after a short time has elaspsed since the graduates left school. But the students were traced after the Directorate of Industrial Training had completed its recruitment of craft and technician apprentices. This is important because the technical schools were supposed to be geared to these DIT apprenticeship programmes. In both years, only about 30 per cent of the graduates succeeded in obtainning DIT apprenticeship programme.

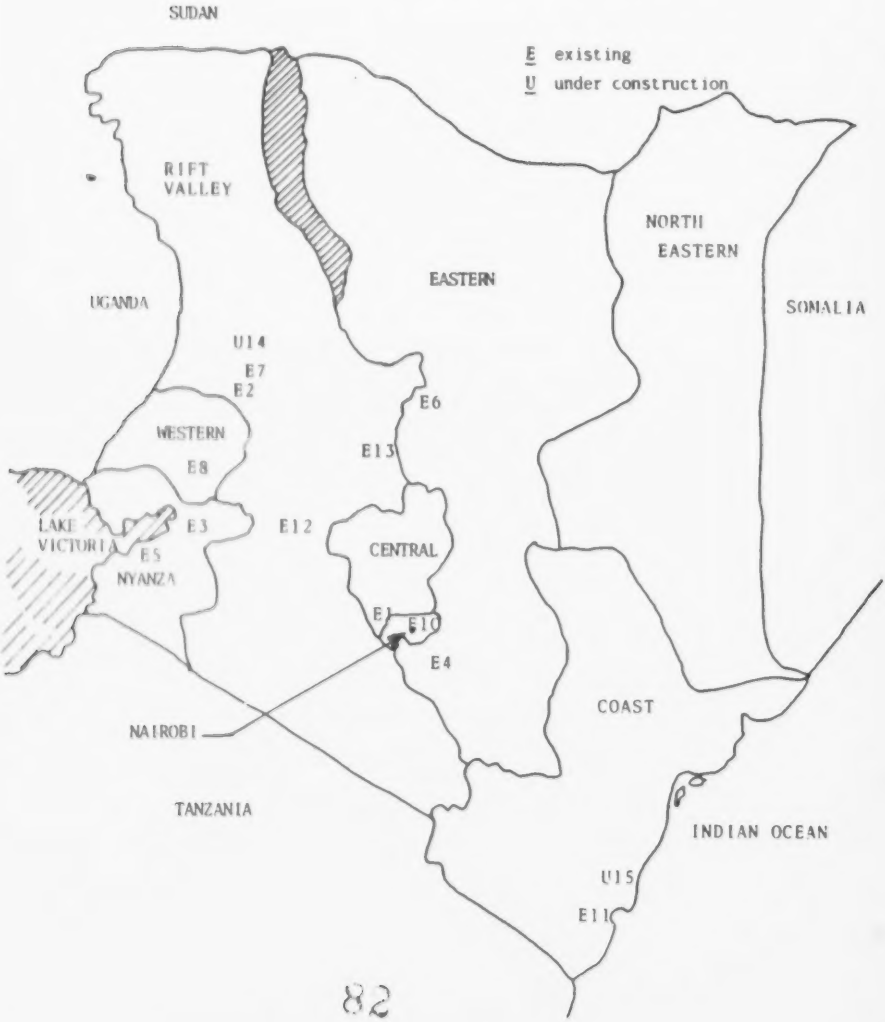
A second tracer study was conducted by Daniel Sifuna for the National Council for Science and Technology of Kenya in 1981. A sample of 726 Technical school graduates who took their 'O' level in 1980 was selected from 11 Technical Schools spread throughout the Republic. First, these students completed a questionnaire while still in Form 4. Then a follow-up of these students was attempted sometime after students had left Form 4. The report does not specify the time lapse until the follow-up was conducted. Information was obtained from 38.8 per cent of the 726 students.

Some three-quarters of those successfully traced had continued their studies in Form 5. Evidently, those entering the labour market were much harder to locate. Time and resources did not enable the follow-up of former students to be carried to an adequately successfull conclusion with regard to showing how students fared in the labour market. However, from available information, it is estimated that about 30 per cent go on to Form 5. There seems,therefore, little reason to believe that technical secondary education is terminal for a good number of students.

Clearly, a professionally conducted tracer study of technical school graduates is long overdue. Such a study would also provide a useful base line, for later appraising the effects of making the technical school courses more vocational in content. In the absence of more complete and reliable data, it is logical to conclude that these schools are not serving as a basis for further technical and vocational training for a large proportion of its graduates.

LOCATION OF TECHNICAL SCHOOLS

1. Kabete
2. Kaiboi
3. Machakos
4. Mawego
6. Meru
7. Rift Valley
8. Sigalagala
9. Thika
10. Nairobi T.H.
11. Mombasa T.H.
12. Nakuru T.H.
13. Nyeri (I.D.A.
14. Kitale
15. Mombasa (Shanzu)



LOCATION OF INDUSTRIAL EDUCATION SCHOOLS

1. Aquinas
2. Chania
3. Chevakali
4. Dagoretti
5. Eastleigh
6. Emusire
7. Highway
8. Homa Bay
9. Kiambu
10. Kagumo
11. Kenyatta
12. Kisumu
13. Kitui
14. Kijabe
15. Lenana
16. Menengai
17. Mangu
18. Maraeno
19. Musingu
20. Nairobi
21. Nakuru Day
22. Nanyuki
23. Njiria
24. Nyandarua
25. Ofafa Jericho
26. Kiakago
27. Thika
28. Uaain Gishu
29. Upper Hill
30. Khamia
31. Kakamega
32. Alliance
33. K.Sil
34. Tudor
35. Wajir

WOOD/METAL WORKSHOPS
POWER/ELECTRICAL WORKSHOPS

2. TRACER STUDIES ON INDUSTRIAL EDUCATION IN KENYA

Industrial Education was introduced in Kenya's education system in early 1960s as a component of practical subjects which would be used to accelerate the modernisation of the economy. Since this diversification programme was started, the development optimism has changed towards a greater degree of pessimism or realism. So as to ascertain the impact of industrial education, a number of tracer studies have been carried out in Kenya which include the following :

1. Report on Employer's views of industrial education by D. Sifuna of Kenya University College, 1984.

2. A long term tracer study of industrial education of students from Nyandarua secondary school, by Martin Davis, Nairobi, 1984.

3. "Practical subjects in Kenya Academic secondary schools". Tracer study by Anders Närman, Swedish International Development Authority (SIDA), Stockholm 1985.

The tracer study of Anders Närman tried to trace a sample of 1.500 ex-students of Kenyan secondary schools who completed their 'O' level certificate of education after 4 years of secondary school in 1983 from 15 schools with industrial education and 5 schools as "control" schools. The sample was interviewed initially during the time of their examination, and a second time in 1984, one year after the examination. The 1984 interviews covered 71 per cent of the 1983 sample. In addition, in November 1983, a retrospective search was conducted on former students of industrial education who sat their 'O' level examinations between 1974 and 1982. In this exercise, 111 former students from three secondary schools from different parts of the country were interviewed and second-hand information was obtained on 203 out of a total of 481 possible students.

Some of the conclusions which were drawn about the students taking industrial education in Kenyan Secondary schools are outlined below.

1. A proportionately high percentage of industrial education students compared to the average holders of 'O' level certificates succeed in getting into Form V. On the other hand, there is a rather high number of industrial education students that are neither in formal school/training nor at work.

2. A large proportion of industrial education students who stayed at home looking for a job were found to be able to earn a subsistence living from different petty crafts. From the retrospective study, it was obvious that many exploited the industrial education skills in a productive way to support themselves.

3. Although all the students of industrial education hoped for further studies including the University, it was evident that a large number was inclined to accept other kinds of more specialised training (including apprenticeship training) with a higher priority for vocational training. Regarding future work, they have a higher inclination for blue-collar jobs in the technical/practical sector.

4. From the retrospective study, it was found that some former students of industrial education were frustrated because they thought industrial education gave vocational skills while in fact it gave pre-vocational skills. The immediate problems to secure employment was temporary although the labour market prospects for 'O' level school leaver have also deteriorated considerably.

5. Industrial education seems to be very useful to the individuals. For those who are not able to enter the formal labour market, there are chances of self-employment. From the retrospective study, it was found that some ex-students of industrial education from Kitui High School had their own workshops, some even with a number of employees.

6. Industrial education gives a greater possibility for adaptation into a more technological society. In school/training, industrial education was found to be useful in the further learning of science subjects, above all physics. At vocational training institutions, ex-students of industrial education have at least an initial advantage compared to those who lack workshop training.

However, it is observed that the available data on tracer studies is not very adequate because the available ones cover only a very short duration. To establish the actual impact of industrial education on the ex-students, it is necessary to carry out a broad and thorough tracer study covering tho who have stayed out of school for a minimum period of 5 years since they completed their schooling.

3. EMPLOYMENT OPPORTUNITIES FOR GRADUATES OF KIAMBU INSTITUTE OF SCIENCE AND TECHNOLOGY (KIST)

The March 1979 Report of an Evaluation of Kiambu Institute of Science Technology gives interesting information on employment situation of the graduates of its first three building courses who came into the job market in 1976, 1977 and 1978* .

EMPLOYMENT SITUATION OF KIST BUILDING COURSE GRADUATES

TYPE OF EMPLOYMENT	number	percentage
Employment by firms, etc.	90	48.9
Self-empoyed	18	9.8
KIST construction and consultancy Firm/Production Unit	23	12.5
Harambee Institute of Technology	12	6.5
Teaching	7	3.8
Further Study	5	2.7
Not employed	7	3.8
No information	22	12.0

The above figure reveal that at least 72 percent easily joined the wage employment in the labour market without much difficulties. The percentage joining the labour market should infact be higher for graduates in other courses such as in engineering. It is also evident that the production unit creates a significant opportunity for employment. At that time those in wage employment started earning between KShs. 675/= and KShs. 1.500/= a month. The remuneration is much higher today by approximately 20 percent.

---

* Report of an Evaluation of Kiambu Institute of Science and Technology. Kiambu, Kenya: March 1979.

It is also encouraging to see that 9.8 per cent of the graduates joint self-employment. Again building trade graduates are likely to enter into this category of employment because at a small-scale not much capital equipment would be required as would be the case in mechanical trades. Those who pursue light engineering courses such as electrical trade are also likely to easily join self-employment.

Those who stay unemployed are likely to be discriminating the available jobs either in the category of self-employment or in the category of wage employment. However if they stay unemployed for sometime they tend to become more realistic and readily accept what is available.

The building course graduates leave the institute with sufficient knowledge and skills to enable them to be self-employed as building contractors or subcontractors or to obtain salaried employment in Government and Private sectors. Some of the graduates have found employment as instructors in Youth Polytechnics or as teacher/instructors in the Harambee Institutes of Technology throughout the country.

A tracer study for graduates of Harambee institutes of technology throughout the country in the various courses would be very useful evaluation of the programme these institutions offer.

4. TRACER STUDY ON TECHNICAL GRADUATES WHO ARE DIRECTLY ABSORBED IN THE INFORMAL SECTOR

Graduates from technical schools who do not gain entry to further training courses, either sponsored by their employers or unsponsored, or to Form V, can be assumed, sooner or later, to find employment in the modern sector of the economy. Very few end up in the informal sector, to judge from House's survey carried out in Nairobi in July-September 1977* .

* William J. House, Nairobi's informal sector : Institute of Development Studies Nairobi Working Paper N° 347, December 1978.

The table shown below summarises the educational level of heads of businesses in the Nairobi informal sector, defined as enterprises operating "out of a temporary structure or from no structure at all".

4. PERCENTAGE DISTRIBUTION OF EDUCATION LEVEL OF INFORMAL SECTOR BUSINESS HEADS BY MAJOR ACTIVITIES

EDUCATION	MANUFACTURING	TRADE	SERVICES
Completed Form 4 (11 years)	3.9 (11)	3.3 (4)	4.3 (7)
Incomplete Secondary (7-11 years- C.P.E. (7 years)	9.1 (26)	12.3 (15)	8.4 (14)
No schooling	32.3 (92)	28.7 (35)	26.2 (43)
	10.5 (30)	15.6 (19)	17.1 (28)

FIGURES IN PARENTHESIS ARE ACTUAL NUMBERS OF RESPONDENTS

As can be seen the majority of respondents had not even passed CPE and the handful of those who had completed Form 4 can be assumed to include very few if any technical leavers. The proportion of Form 4 technical school leavers joining the informal sector is likely to have increased substantially as a result of reduced chances of getting wage employment due to economic performance currently prevalent in Kenya today. This is another area which requires a comprehensive tracer study.

CONCLUSION

One of the main achievements of productive work programmes in technical and vocational education at craft and technical levels in Kenya can be said to be that it has proved capable of mobilising personnel and resources at a local level thus benefiting the local communities particularly in the rural settings. Some of the main constraints are lack of efficient organisation of the productive programmes and especially the marketing of services and products intended for sale. Most of the programmes have limited scopes because of inability to get some equipments whose capital and running costs especially on the part of spare parts is prohibitively high. The scope of these programmes is also constrained by lack of quality control and research facilities including personnel. However, where training and production can be realistically created, there is scope for considerable expansion of non-formal schemes that conceive pre-employment training as training is much more than vocational skills.

ANNEX I

Annex to guidelines

BASIC DATA

Name of Country : KENYA

Geographical Situation:
LAT 5°N and 5° S
LONG 34°E and 41°E
Area : 582.646 Km²
Population : 19.540.000 (1984)

Currency : KENYA SHILLINGS

1 K £= 20 Kenya Shillings US $ equivalent: 16.7325 (at OCT 1985)
Per capita income at current prices: (KSH. 3786.2 at 1984)

Gross National Product at Current Prices (1984) and Manpower Distribution

	GNP %	Manpower
Agriculture, Forestry and Fishing	31.9	19.8
Mining, manufacturing, repairing and quarrying	13.7	13.60
Electricity, water and construction	7.5	4.9
Commerce and finance	29.6	10.7
Transportation and occupation	5.6	5.7
Less Service Charges	15.5	45.3

Public Sector Finance K£' 000.000n

	Actual		Projected
	1982/83	1983/84	1984/85
Central Govt. revenu	845.9	994.9	1.153.1
Central Govt. Re-current expenditure	967.7	994.7	1.162.9
Current surplus or deficit (+)	-121.9	+000.1	- 9.7
Development expenditure	223.0	253.0	398.3
i) Central Govt. Re-current expenditure on Education	192.1	210.3	238.3
ii)Total Re-current Expenditure	1.014.7	1.051.1	1.220.8
percentage of (I) to (II)	18.9	20.0	19.5

Reccurent cost per pupil (1978/79) - day student only in US $

1979 10 $ = KSH. 7.328

		US $
Primary	73.7	
Lower Secondary	360.3	
Secondary (Aided)	360.3	
Upper general secondary	-	
Secondary technical	683.7	
Secondary I.E.	473.5	
Post Secondary Technical	1.364.6	
General Teacher Training	1.334.6	
Technical teacher training	3.378.8	
University	6.255.5	

Total spending on education 1983/84 as percentage of GNP = 11.0 %

Enrolment 1979 (difference of 1983 IN'000s (at least 5 years)	M F	Male	Female
Primary	3.698.2	2.249.2	2.074.6
Lower secondary) Upper Sec. (General))	376.8	293.2	199.6
Upper Sec. (Technical)) Upper Sec. (Vocational))	7.7	9.3	-
Pst. Sec. Technical) (Higher technician))	4.5	9.5	-
Primary teacher training	9.9	6.8	4.5
Sec. teacher training	2.9	2.9	2.1
University of Nairobi	6.7	5.3	1.6

Source : Adapted from statistical abstract 1984, Economic survey 1985 and working party on Financing Higher Education 1982.

Distribution of active population among the major economic sectors by level of technical education qualification (as %)

	Technologists and engineers	Higher Technician	Mid-level technician	Skilled Workers	Unskilled Workers
Agriculture	0.04	0.06	3.1	6.2	8.9
Mining, manufacturing repairing and quarrying	0.6	0.5	6.0	38.3	17.5
Electricity, water and construction	3.9	3.6	3.6	34.2	12.7
Commerce and finance	2.3	1.7	3.7	12.6	50.8
Transportation and Communication	3.4	0.4	5.2	8.2	81.2
Govt. and other services	0.6	0.4	5.2	81.2	81.2

Source : Adapted from Republic of Kenya, Employment and Earnings in the modern sector, 1980.

COUNTRY PROFILE
TECHNICAL AND VOCATIONAL EDUCATION

LEGISLATION

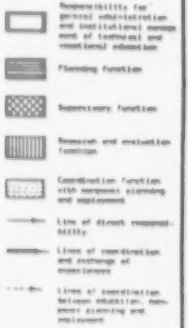
10

1. The 1963 Kenya African National Union (KANU) Manifesto.
2. The Sessional Paper N° 10 of 1965
3. The Educational Act (1968) Revised (1980)
4. The Board of Adult Education Act (1966)
5. The Teachers Service Commission Act (1967)
6. The University of Nairobi Act (1970) Revised 1985
7. The National Council of Science and Technology Act (1978)
8. Industrial Training Act (1979)
9. The Kenya National Examinations Council Act (1980)
10. Moi University Act (1984)
11. Kenyatta University Act (1985)
12. Higher Education Council Act (1985)

ADMINISTRATIVE STRUCTURE

20

SEE ANNEX II-B OVERLEAF


Responsibility for general administration and institutional management of technical and vocational education
Planning function
Supervisory function
Research and evaluation function
Coordination function with manpower planning and employment
Line of direct responsibility
Lines of coordination and exchange of experiences
Lines of coordination between education, manpower planning and employment

STRUCTURE OF THE EDUCATIONAL SYSTEM

30

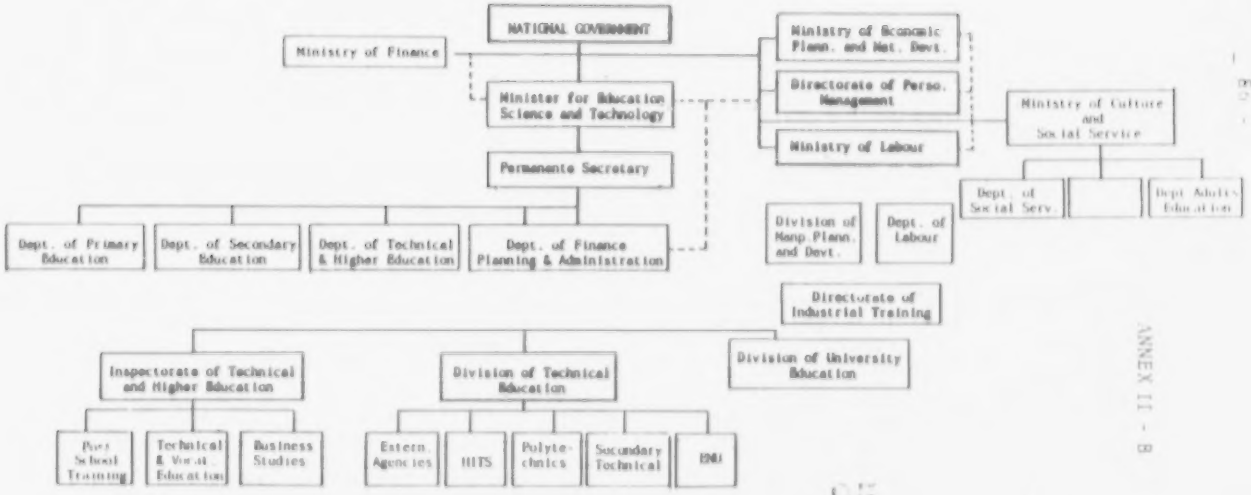
SEE ANNEX II-C OVERLEAF

▲ Entrance Examination
○ National Certificate
● National Diploma
■ Degree

COUNTRY PROFILE

TECHNICAL AND VOCATIONAL EDUCATION

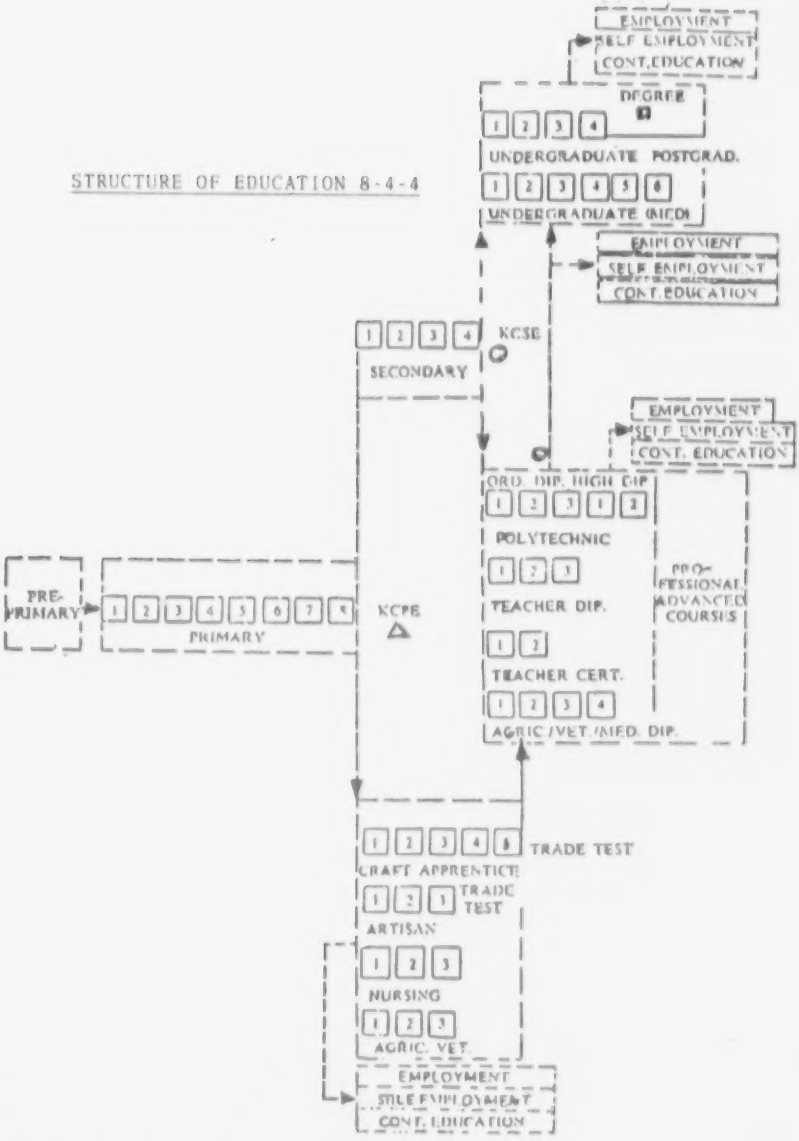
ADMINISTRATIVE STRUCTURE



ANNEX II - 8

ANNEX II - C

STRUCTURE OF EDUCATION 8-4-4



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ABSTRACT

One of Kenya's major national priorities is the implementation of the policy of making the district the focus for development, thereby bringing the people into the forefront of provision for their own welfare. The second priority is the introduction of an 8-4-4 (8 years primary, 4 years secondary, 4 years university) education program to replace the existing 7-6-3 education program. Since Kenya's independence in 1963, its system of vocational-technical education has been regulated by 12 main policy documents. The country's entire vocational-technical curriculum is currently in the process of being reorganized. Industrial education was introduced into academic secondary schools in 1961. Programs in agriculture, business, and home science are offered. A number of technician and craft programs are also available, as are programs of study through national polytechnics and colleges. The main achievement of the productive work programs in vocational-technical education at craft and technical schools is that they have proved capable of mobilizing personnel and resources at the local level, thus benefiting local communities (especially in rural settings). However, these programs have also been hindered by a lack of effective organization and marketing efforts. (Appendixes include data on the numbers of present training institutions in Kenya.) (MN)

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28

STUDIES IN TECHNICAL AND VOCATIONAL EDUCATION

ED300528

Organisation of Productive Work in Technical and Vocational Education

Republic of Kenya

1985

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2. The Organisation of Productive Work in Technical and Vocational Education in the United Kingdom (1983, English).

3. The Organisation of Productive Work in Secondary Technical and Vocational Education in the People's Republic of Bulgaria (1983, English).

4. Policy, Planning and Administration of Technical and Vocational Education in Ghana (1983, English).

5. Politique, Planification et Administration de l'Enseignement Technique et Professionnel en Turquie (1983, French).

6. Politique, Planification et Administration de l'Enseignement Technique et Professionnel en Algérie (1983, French).

7. Policy, Planning and Administration of Technical and Vocational Education in the Netherlands (1983, English).

8. Policy, Planning and Administration of Technical and Vocational Education in India (1983, English).

9. Computers in Technical Teacher Education in the United Kingdom (1984, English, Arabic).

10. Computer Sciences in Vocational Teacher Education in Denmark (1984, English).

11. The Organisation of Educational and Vocational Guidance Services (1985, English).

12. Policy, Planning and Management of Technical and Vocational Education in the Hashemite Kingdom of Jordan (1985, Arabic).

ORGANIZATION OF PRODUCTIVE WORK

IN TECHNICAL AND VOCATIONAL EDUCATION

IN KENYA

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Nairobi, 1985

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PREFACE

The present document is a further addition to the series "Studies in Technical and Vocational Education". These studies are based on a Unesco policy instrument, the Revised Recommendation concerning Technical and Vocational Education, which was adopted by the General Conference at its eighteenth session in November 1974. Furthermore, they are in conformity with Approved Programmes 20 C/5, 21 C/5, 22 C/5 and 23 C/5, which indicated that a number of guides, studies and publications in the field of technical and vocational education would be reproduced. The studies are intended to assist policy-makers, planners, administrators and experts in technical and vocational education. They reflect Unesco's concern with fostering an effective exchange of experiences and ideas in this field as well as Member States' efforts in promoting the implementation of the Revised Recommendation and the development and expansion of technical and vocational education.

The studies, which were prepared under contract for Unesco, should be considered as information documents that require continual revision and updating. A list of the studies appears at the beginning of this document.

We wish to express our appreciation to all those who participated in preparing this study and hope that it will provide its readers with information useful to them in the promotion and development of technical and vocational education.

The views expressed in this study are those of the individual(s) concerned with its preparation and do not necessarily reflect those of Unesco. The designations employed and the presentation of the material do not imply the expression of any opinion whatsoever on the part of the Unesco Secretariat concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

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A C K N O W L E D G M E N T S

I wish to thank Mr. J.B. Mburugu, Senior Inspector of Schools in charge of Business Studies in my Department for gathering the basic data. I should like to express my appreciation to Annet Munyi and Rose Owino for the great effort they made to type the manuscript.

October 1985

DMM

LIST OF ABBREVIATIONS

GOK	Government of Kenya
HIT	Harambee Institute of Technology
IE	Industrial Education
KACE	Kenya Advanced Certificate of Education (certificate obtained on successful performance in an examination taken after 6 years of secondary education or 'A' level)
KCE	Kenya Certificate of Education (Certificate awarded on successful performance in an examination taken after 4 years of secondary education or 'O' level)
K£	Kenya Pound = 20 Kenya shillings
Ksh	Kenya shilling (official Kenya currency)
KSTC	Kenya Science Teachers College
KTTC	Kenya Technical Teachers College
KUC	Kenyatta University College (Now Kenyatta University)
MCSS	Ministry of Culture and Social Services
MEST	Ministry of Education, Science and Technology
SEP	Secondary Education Project
PEP	Primary Education Project
SIDA	Swedish International Development Agency
TEP	Technical Education Project
TVE	Technical and Vocational Education
YP	Youth Polytechnic

PART ONE

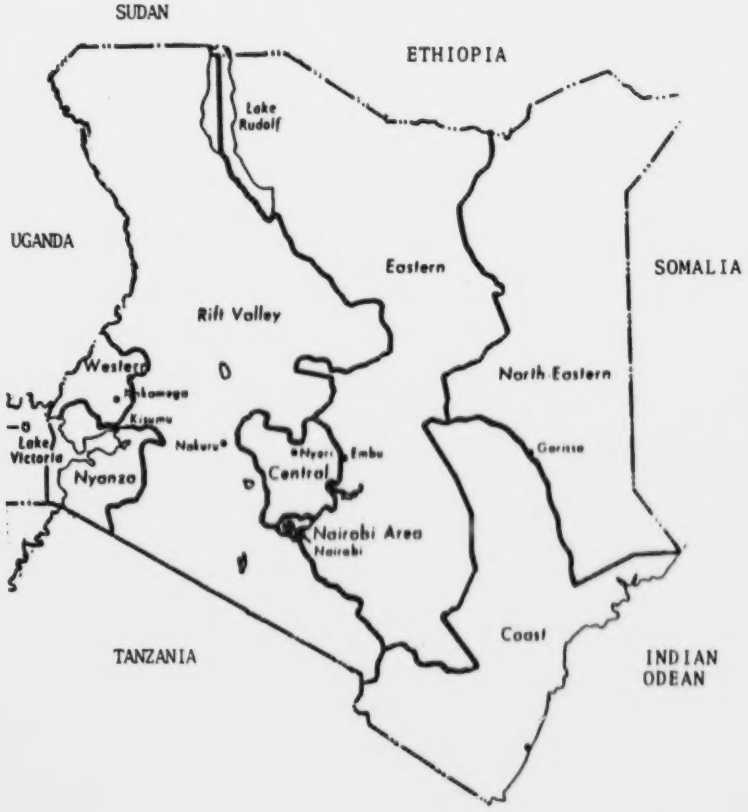
BACKGROUND INFORMATION

KENYA is a former British colony which gained independence on 12th December 1963. The country is divided into 8 administrative provinces which are further divided into 42 districts as shown in maps on pages 5 and 6. The capital of Kenya is Nairobi, with a population of approximately one million residents.

The growth of the economy for the last 20 years since independence, i.e. 1964 to 1983 has been at an average annual rate of 5.2 per cent considering an average population growth rate of 3.6 per cent for the whole period, the per capita income has grown at an average rate of 1.5 per cent. However, due to adverse effects of the worsening in the country's term's of trade as a result of international economic recession, the increase on prices and the recent drought, the per capita incomes have shown a declining trend. On the other hand it is important to observe that the production of Governement services was the fastest growing sector followed by industry, then by other services and thereafter agriculture. The relative growth of Government services has been in keeping with the objective of promoting African Socialism through state control and direction of the nations resources.

Currently, one of the major national preoccupation is the implementation of the policy of making the district the focus for developent thereby bringing the people into the forefront of their own provision of things for their own welfare. The second preoccupation is the introduction of the 8-4-4 education programme to replace the existing 7-6-3 education programme.

MAP OF KENYA AND ITS DISTRICTS



PART TWO

THE COUNTRY PROFILE

Legislations in force which affect Technical and Vocational Education in Kenya.

The legal framework for Kenya's TVE since independence has been created and operated under the following policy documents.

1. The 1963 Kenya African National Union (KANU) manifesto by which the Government committed itself to eventual provision of universal free education and spelt out other socio-economic aspirations to be met by education.

2. The sessional paper N° 10 of 1965, in which education was seen as "much more of an economic than social service ..... the principal means for relieving the shortage of domestic skilled manpower and equalizing economic opportunities among all citizens."

3. Education Act (1968), Revised (1980), which put the responsibility for education in the hands of the Minister for Education and instituted various organs for the organisation and management of education at all levels.

4. The Board of Adult Education Act (1966) established the Board of Adult Education to co-ordinate and promote activities in adult education.

5. The Teachers Service Commission Act (1967) established a single employer and unified terms of service for all teachers.

6. The University of Nairobi Act (1970), revised 1985, established a National University.

7. The National Council of Science and Technology Act (1978) established a body to co-ordinate research in science and technology and to advice the Government on relevant policy matters.

8. The Industrial Training Act (1979) established to raise funds for training in TVE and regulate the training of apprenticeships and indentured learners.

9. The Kenya National Examinations Council Act (1980) established as a national body to administer public examinations including those in TVE.

10. The Moi University Act (1984) established Moi University which will be a technological oriented University.

11. Kenyatta University Act (1985), established to train teachers at secondary and post-secondary education levels.

12. The Higher Education Council Act (1985) established to regulate the operation of University education including the running of private Universities.

ADMINISTRATIVE STRUCTURE

This has been displayed in Annex 11 - B

STRUCTURE OF THE EDUCATIONAL SYSTEM

This has been displayed in Annex 11 - C.

Details on types of schools as well as entrance examinations required and certification awarded have been described from page 86 to page 87.

ENROLMENT STATISTICS

The available data does not show areas of specialisation as required in Table 1 Form B. Therefore the data contained in this table especially in terms of areas of specialisation is based on estimates.

There is inadequate collection of data on enrolments for courses outlined under Technical and Vocational Education. The data shown in this table regarding this section is therefore incomplete. What is shown is collected from some of the largest institutions involved in Technical and Vocational Education.

A detailed national survey would be required to gather all the data on enrolment in different training institutions.

In Table II some of the areas of specialisation do not render themselves to part time vocational education. This is so in the case of Fine Arts and Applied Arts and agricultural, forestry and fishery programmes.

However, some areas such as Engineering programmes which are not listed under this table are popular for part-time vocational education.

In Table III, it should be noted that persons aged under 18 are not employable in Kenya. There is no data regarding those who are employed but not enrolled in education and those unemployed and not enrolled in

education. The only category whose data is available as of 1979 are those aged between 15 and 19 years who are not enrolled in any form of education.

In 1979, a large number, nearly half a million youth aged between 15 and 19 years were still attending primary education. This figure is likely to have decreased because of the rapid expansion of secondary schools since then thus minimising repeating and also because many children these days go to schools at the age of 6 years insted of going at the age of 8 or 9 years as was the case in the past.

CURRICULUM

At the moment the entire curriculum in technical and vocational education is in the process of reorganisation. The curriculum for artisan courses has been overhauled. The sample given in Form C is only for full-time attendance as that for part-time attendance has not been designed.

PART THREE

THE ORGANISATION OF PRODUCTIVE WORK IN TECHNICAL AND VOCATIONAL EDUCATION IN KENYA AT THE CRAFT AND TECHNICIAN LEVELS

A. INTRODUCTION

The history of the formal education systems in almost all developing countries reveals consistent attempts to diversify secondary education away from its dominant academic norm into vocationalised direction through introduction of a wide range of programmes. A broad range of goals have been articulated for such programmes. They range from the provision within school contexts of relevant skills, values, attitudes and knowledge for modern sectors of agrarian employment to the provision of solutions to problems of urban migration and unemployment.

In Kenya, the introduction and expansion of technical and vocational education was witnessed in a large scale in the early 1970s. This move was a result of Government's reaction to public pressure for increased practical skills in the field of general secondary education. The purpose of introducing these subjects was "to relate national needs of people to work in craft and industrial - based, wage-earning jobs to the need for increasing numbers of people to seek profitable self-employment in this type of work".

In 1982 the Government of Kenya decided to restructure the entire education and replace the 7-6-3 system with 8-4-4 system. This change to the new system has placed a great challenge to vocational and technical education and training programmes in the country.

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1. Republic of Kenya, Ministry of Education. A study of curriculum Development in Kenya, A Report of Advisory Mission led by Gordon S. Bessey, C.B.E., M.A., D-C.L., 1972.

B. HISTORICAL BACKGROUND OF TECHNICAL AND VOCATIONAL EDUCATION IN KENYA

In Kenya, the history of technical and vocational education and training goes back to the time of establishment of a training Depot at Kabete in 1924. The Native Industrial Training Depot at Kabete (N.I.T.D.) was established to provide training for the ex-servicemen who had served in the 1914 1918 World war. In 1949, the Native Industrial Training Depot at Kabete was changed into a Technical and Trades School. In the 1949-50, eight other Technical and Trade schools were started in different parts of the country. Five other Technical and Trades schools were established later.

Technical and Trades schools admitted students who had done well in the final examination after eight years of primary school but failed to find places in the few secondary schools. The technical and trades schools followed purely trade syllabuses in areas such as Building, Mechanical, Electrical, Tailoring, etc, for one year. At the end of one year, students sat for selection examinations and those who did well followed or four years a further trade syllabus supported with subjects such as English Language, Mathematics, Science and Civics. After the four years, students took Government Trade tests Grade III which on passing enabled them to get a job as artisan in industry.

In 1956 the Royal Technical college (Now Nairobi University) was set up to offer more advanced technical courses leading to technician and professional qualifications in various fiels. In 1961, Kenya Polytechnic was opened to take over the courses of the Royal Technical College because the latter became a constituent college of the University of East Africa. The courses at the Kenya Polytechnic included a wide range of technical courses at craft level, Ordinary National Certificate and Higher National Certificate. Later, the craft courses were phased out and replaced with technician courses. The National Certificate courses were replace with Ordinary Diploma and Higher Diploma respectively. In 1972, Mombasa Technical Institute former Mombase Institute of Muslim Education was renamed Mombasa Polytechnic to offer similar courses to those offered at the Kenya Polytechnic.

In 1969, all the 13 Technical and Trades Schools were converted into Technical and Vocational Secondary Schools. As the interest in technical and vocational education increased, four new schools were added. With the conversion of Technical and Trades schools a new curriculum was introduced to follow the syllabuses of the City and Guilds of London. The new syllabuses were intended to combine the general technical education with some academic studies in the first two years of secondary schools and to specialize in one particular trade during the third year. At the end of two years, students sat for a final examination known as Kenya Junior Secondary Technical Examination (KJSE) and the results of this examination was used to select and place students into various trade specialisations such as masonry, mechanical enginnering, automotive engineering, carpentry and joinery, etc.. At the end of the third year, students sat for the examination of City and Guilds Craft Certificate, Part I.

In 1970, the three-year City and Guilds Crafts Part 1 syllabus was replaced with a four-tear technical education curriculum (40 per cent practical and 60 per cent theoretical) which was first examined by the East African Examinations Council in 1974 in the same pattern as the academic subjects. The stress in the four-year curricula was to produce secondary school leavers who are academically sound and competent to benefit from further training opportunities at the national polytechnics and other similar institutions of learning.

In addition to the conventional technical trades, the curricula included mathematics, English, Geography and for girls Tailoring and Business Education. Good examination peformances is emphasized. This change made these institutions to lose their vocational training roles.

Before 1969, the six-year curricula which consisted of 90 per cent practical and 10 per cent theory offered in the technical and trade schools emphasised on preparing the student for direct wage or self-employment. In effect, the technical secondary school curriculum which was introduced In 1970 is conceptualized as schools based incomplete

vocational training that needs to be complemented by some kind of employment-based further training leading to craft apprenticeships or technical apprenticeships administered by the Directorate of Industrial Training.

The students who finish their education from these schools are as vulnerable to unemployment as those who finish their general education in ordinary secondary schools. The date, the majority of these are joining Form 5 for further academic education. This means that although technical education is very expensive, it is not economically viable under the present set up. The Government of Kenya has therefore decided that these institutions be converted into training institutions.

The Courses offered in the existing 19 institutions are outlined on the following page.

SCHOOL	PROGRAMME	OUTPUT/LEVEL
1. Kabete	a) Basic Building Trades	'O' level
	b) Basic Mechanical Trades	"
	c) Basic Electrical Trades	"
	d) Basic Automotive Trades	
2. Machakos	a) Basic Mechanical Trades	"
	b) Basic Automotive Trades	"
	c) Basic Electrical Trades	"
3. Meru	a) Basic Building Trades	"
	b) Basic Carpentry/Joinery	"
	c) Basic Plumbing Trades	"
4. Thika	a) Basic Mechanical Trades	"
	b) Basic Electrical Trades	"
	c) Basic Automotive Trades	"
	d) Basic Agricultural Mechanical Trades	"
5. Sigalagala	a) Basic Building Trades	"
	b) Surveying	"
	c) Basic Plumbing Trades	"
	d) Basic Carpentry/Joinery	"
6. Rift Valley	a) Basic Mechanic Trades	"
	b) Basic Automotive Trades	"
	c) Basic Electrical Trades	"
	d) Basic Welding Trades	"
7. Kisumu	a) Basic Mechanical Trades	"
	b) Basic Electrical Trades	"
	c) Basic Automotive Trades	"

8. Kaiboi	a) Basic Mechanical Trades	"
	b) Basic Agricultural Mechanical	"
	c) Basic Automotive Trades	"
9. Mawego	a) Basic Building Trades	"
	b) Basic Carpentry/Joinery	"
	c) Basic Plumbing Trades	"
10. Mombasa	a) Basic Building Trades	
	b) Basic Carpentry/Joinery Trades	"
11. Nairobi	a) Basic Mechanical Trades	"
	b) Basic Electrical Trades	"
	c) Basic Automotive Trades	"
12. Kakuro	a) Basic Mechanical Trades	"
	b) Basic Automotive Trades	"
	c) Secretarial Skills	"
	d) Basic Electrical Trades	"
	e) Accountancy	"
13. Nyeri	a) Basic Mechanical Trades	"
	b) Basic Automotive Trades	"
	c) Basic Agricultural Mechanical Trades	"
	d) Secretarial Skills	"
	e) Basic Welding Trades	"
	f) Tailoring and Fashion Design	"
	g) Accountancy	"
14. Kinyanjui	a) Secretarial Skills	"
	b) Basic Automotive Trades	"
15. N'Kabune Girls	a) Secretarial Skills	"

16. Sagana (Assisted)	a) Basic Mechanical Trades	"
	b) Basic Automotive Trades	"
17. Masai	a) Basic Automotive Trades	"
	b) Basic Water Engineering Trades	"
	c) Basic Building Trades	"
	d) Basic Carpentry/Joinery Trades	"
18. Kitale	a) Basic Mechanical Trades	"
	b) Basic Automotive Trades	"
	c) Basic Agricultural Mechanics Trades	"
	d) Basic Electrical Trades	"
19. North Eastern (New)	a) Basic Building Trades	"
	b) Accountancy	"

INDUSTRIAL EDUCATION IN ACADEMIC SECONDARY SCHOOLS

Industrial Education was introduced in the post-independence education system in Kenya beginning from 1961. By 1966 there were 15 secondary schools teaching Industrial Arts Education such as Woodwork, Metal work, and domestic science for girls. In 1974, the Swedish Government through the Swedish International Development Agency, agreed to support by enlarging and modernising the industrial education workshops in 15 secondary schools and building new workshops in 20 other secondary schools. By 1982, a total of 35 Industrial Education Schools were fully equipped. Today these schools teach either woodwork Technology or Metalwork Technology or Power Technology or Electrical Technology or Technical Drawing together with other academic subjects. The purpose of these subjects is to equip the students with knowledge and practical skills in the use of tools, materials and machines and to develop in them an insight and understanding of the industry and its place in the Kenyan society. The course is also intended to develop positive attitudes towards the world of work and provide a foundation for further education and training.

AGRICULTURE

By 1972 only 38 secondary schools offered general agriculture. At the end of 1974, about 100 secondary schools offered general agriculture. As of 1984, secondary schools offered agriculture for the final examinations of secondary education. This subject is intended to develop skills and knowledge which would lead the student to develop positive attitudes towards respecting agriculture as an occupation that is both profitable and honourable. The youth is made to appreciate that by application of scientific principles and modern farming practices, they can transform labour into a lucrative business especially in the rural areas.

BUSINESS EDUCATION

Business Education was intensively introduced in the academic secondary schools as part of vocational training beginning from early 1970. By 1974, 30 secondary schools offered one or more business education subjects. By 1984 there were more than 500 secondary schools teaching these subjects. The aim of these subjects is to increase the individual's knowledge and awareness of business and commercial activities in order to enable him to make intelligent and logical economic decisions. In addition, the knowledge and skills should enable him to obtain some basic utility skills, be self-reliant in the business world both in rural and urban areas and to be innovative and have initiative. Finally the individual should develop a sufficient foundation for further academic education and professional studies.

HOME SCIENCE

Like the other practical subjects home science was given a major emphasis in the secondary school curriculum in early 1970s when facilities were established in 29 secondary schools throughout the country. As at 1984,

there were 200 secondary schools in Kenya. The purpose of this subject is to expose the youth to the importance of working in craft and wage earning activities in an effert to seek self-employment. This subject like the other practical subjects should encourage attitudes which not only pay due regard to the economic value of these skills but also transform indifference towards recognition that craftwork of all kinds demands intelligence and persistence and skill of a high order.

EXISTING TECHNICIAN AND CRAFT PROGRAMMES

These programmes fall under the following categories:

i) Technician apprentices sponsored by the employer, are trained in National Industrial Vocational Training Centres situated in Nairobi, Mombasa and Kisumu. This programme involves a purely practical training of craft and technicians apprentices. The training is administered by the Directorate of Industrial Training which was established in 1965 under the Ministry of Labour and whose council is constituted by employers in the public and private sectors. Holders of 'O' level certificate of education are admitted to joint the secondary apprenticeship courses.

ii) Technician courses Parts I-III Ordinary Technician Diploma and Higher Technician Diploma Programmes are taught at Kenya Polytechnic, Mombasa Polytechnic and Jomo Kenyatta College of Agriculture and Technology, which provide the largest training avenue at this level. Technician courses which last 4-5 years and ordinary Technician Diploma which last 2½ years are open to secondary school leavers. Holders of Technician Parts III who wish to take the Higher Technician Diploma take a bridging course consisting of advanced Mathematics and Sciences for one year and complete the Higher Diploma in 2½ years. The Technician courses Parts I-III are more practical in approach than the Diploma Courses which are more theoretical. Attendance for technician courses is usually sandwich or block-release while attendance for Diploma courses is full-time study. The present Higher Diploma in

Engineering or Building courses is regarded equivalent to a first degree in the respective field. A third Polytechnic known as Eldoret Polytechnic is expected to start offering ordinary Diploma and Technician courses in 1987.

iii) Craft part I and II courses are offered at the Kenya Technical Teachers College and 15 Harambee Institutes of Technology. The standard of these craft courses is comparable to the Technician part I - II and the ordinary diploma courses offered at the National Polytechnics mentioned earlier. However, most of the Harambee Institutes of Technology lack adequate physical facilities, equipment, qualified staff and recurrent expenditure. The craft and technician courses in the last two categories are outlined below :

1. NATIONAL POLYTECHNICS AND COLLEGES

i) Craft courses

1. Electrical Installation
2. Printing Craft Courses
3. Junior Building Supervisors
4. Plumbing Services

ii) Technician courses

1. Agricultural Engineering
2. Mechanical Engineering Production
3. Mechanical Engineering Plant
4. Welding and Fabrication
5. Motor Vehicle
6. Refrigeration Engineering
7. Heating, Ventilation and Air Conditioning
8. Construction Plant
9. Electrical Engineering (Power)

10. Electrical Installation
11. Radio, Television and Electronics
12. Building Construction
13. Telecommunication Engineering
14. Industrial Measurements and Control
15. Architectural
16. Irrigation Engineering

iii) Ordinary diploma courses

1. Horticulture
2. Food Processing
3. Agricultural Engineering
4. Institutional Management
5. Mechanical Engineering
6. Electrical Engineering
7. Civil Engineering
8. Land Surveying
9. Cartography and Air Survey
10. Building Construction
11. Applied Chemistry (Analytical)
12. Applied Chemistry (Industrial)
13. Applied Biology (Histology/Citology and Anatomy/Museum)
14. Applied Biology (Animal Physiology/Pharmacology and Taxicology)
15. Applied Biology (Ematology and P st Control Plan Pathology)
16. Medical Laboratory Technology (Microbiology/Immunology)
17. Medical Laboratory Technology (Histopathology/Anatomy)
18. Medical Laboratory Technology (Chemical Pathology/ Haemotology and Serology/Immunology)
19. Food Technology (Food Engineering)
20. Food Technologyy (Food Quality Control)
21. Diploma in Management

22. Water Engineering
23. Computer Sciences
24. Supplies Management
25. Transport Management
26. Secretarial Studies

iv) Higher diploma courses

1. Mechanical Engineering
2. Electrical Engineering
3. Electronic Engineering
4. Water Engineering
5. Highway Engineering
6. Civil Engineering
7. Building Construction/Economics
8. Land Surveying
9. Cartography and Air Survey
10. Applied Sciences

11. HARAMBEE INSTITUTES OF TECHNOLOGY AND KITC

1. Radio and T.V. Servicing Craft
2. Mechanical Engineering Production Craft
3. Mechanical Engineering Plant Craft
4. Electrical Engineering Power Craft
5. Motor Vehicle Mechanics Craft
6. Electrical Installation Craft
7. Building Construction
8. Agricultural Mechanics Craft
9. Carpentry and Joinery craft
10. Plumbing Services Craft
11. Blocklaying and Concreting Craft

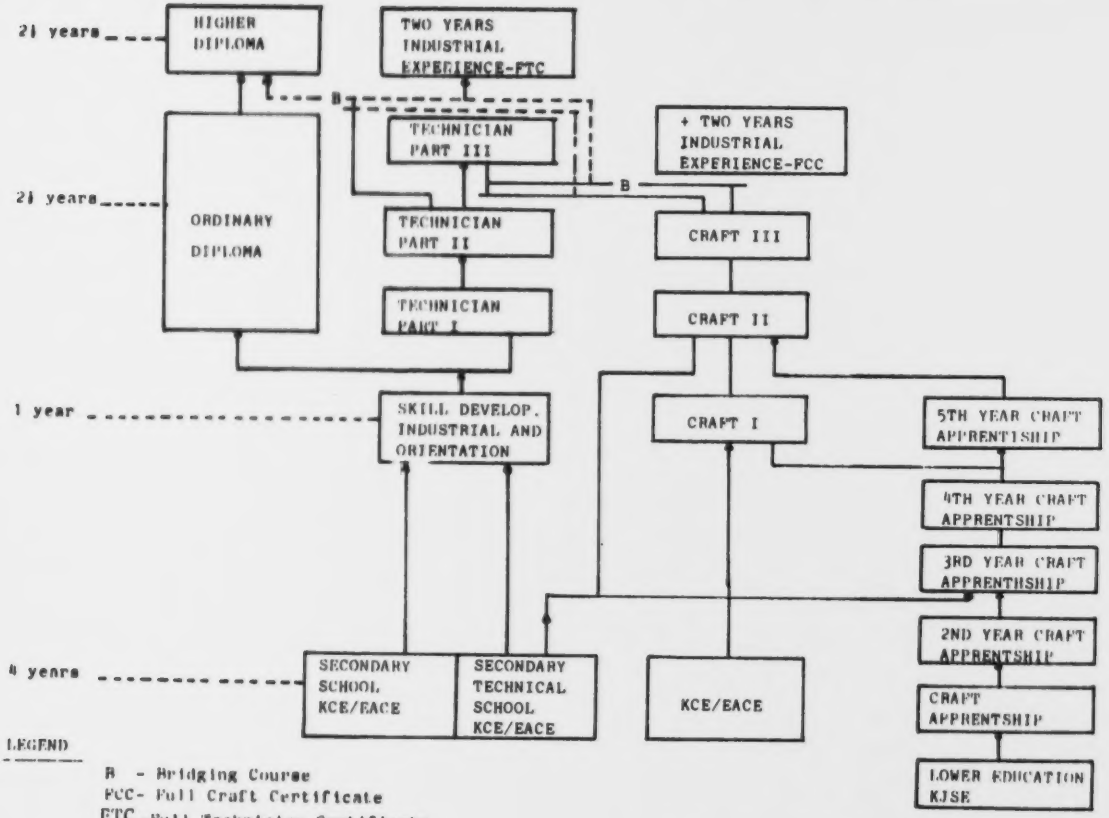
12. Garment Manufacture
13. General Agriculture
14. Dryland Farming
15. Accountancy, ACNC, CPA and CPS (Part 1)
16. Secretarial Skills (Typing, Shorthand, etc.)
17. Water Operators Courses
18. Transport Management

It is important to note that Harambee Institutes of Technology are training institutions established beginning early 1970s in the rural areas as local self-help projects in an effort to provide technical training to students who have finished secondary school education. In 1974, the Government (through the then Ministry of Education) incorporated the Harambee Institutes of Technology within national system of technical education and training. The graduates from these institutions are expected to be able to carry out technical jobs within the framework of a modern industrial enterprise, or to furnish technical expertise in the local community.

By 1983, 14 Harambee institutes of technology had witnessed successful graduation of 2.999 students in different courses. The total student enrolment in these institutions during the 1983/84 academic year were 3.904. These graduates are encouraged to go into self-employment but the majority are employed in the public and private sectors.

The flow chart shown in figure 1 gives a diagrammatical presentation of the programmes offered at the Craft and Technician levels.

TECHNICAL EDUCATION FLOW-CHART



YOUTH POLYTECHNICS

The issue of school leavers with a view to exploring ways and means of expanding training opportunities to absorb the soaring masses of these school leavers has been of a major concern to every Kenyan since independence. In 1966, the National Christian Council of Kenya (N.C.C.K.) raised this issue particularly for primary school leavers and suggested a practical solution. In 1967, the N.C.C.K. established a few training institutions known as Village Polytechnics for primary school leavers. Later, the responsibility of these institutions was left in the hands of the local communities in partnership with the Government, currently through the Ministry of Culture and Social Services. Today, these institutions are known as Youth Polytechnics. Currently, (1985) there are 320 Youth Polytechnics spread throughout the Republic of Kenya and with an annual enrolment of 15.000 trainees. The Youth Polytecnics are currently using vocational based training syllabuses which lead to Government Trade Test practical examinations. A few of them offer business studies courses which are examined by the Kenya National Examinations Council. This curriculum emphasis technical and practical work skills at Artisan level and run for 12 to 24 months. In addition to the 320 polytechnics, there are 170 youth centres run by religious organisations. These centres offer a curriculum similar to that of the youth polytechnics. The physical facilities such as workshops, classrooms dormitories and teaching equipment in this category of institutes are of different qualities and quantites because of varying financial abilities available to local communities.

Youth polytechnics are basically rural institutions and communities have to find most of their resources themselves. The Government assists with salaries for instructors some tools and equipment. A large proportion of assistance has been forthcoming to youth polytecnics, tools and equipment from the Non-Government Organisations (NGO'S) such as CARE-Kenya and Action Aid-Kenya.

KENYA INDUSTRIAL TRAINING INSTITUTE

This institute is sponsored and organised by the Ministry of Commerce and Industry and furnishes technical training in a variety of fields. Graduates from this institute seek employment throughout the country or engage in self-employment business activities.

INDUSTRIAL EDUCATION AND TECHNICAL EDUCATION COSTS

The major proportion of capital and recurrent cost for the introduction and implementation of Industrial Education and Technical Education curriculum in Kenya has largely been funded by Swedish International Development Agency which consists of 75 per cent of the total project costs. The table below gives an analysis of this funding.

ANALYSIS OF SIDA FINANCED I.E. PROJECT - COSTS FOR PERIOD BETWEEN 1974 AND 1984

CATEGORY OF EXPENDITURE	AMOUNT KSHS.
Building: New and renovated workshop	11.507.000
Staff houses	2.200.000
Electricity	500.000
Furniture	836.686
Equipment	9.513.191
Professional services	364.844
Project office	(100)
Technical assistance	(2.595.000)
Volunteers	(100.000)
Kabete Maintenance Unit	(558.000)
TOTAL EXPENDITURE	28.194.821

Bracketed figures are heavily estimated.

SOURCE: An Evaluation of Industrial Education in Kenya. The contribution of cost studies, by Dr. C.E. Cunning Moray House College of Education, Edimburg, U.K., 1984.

Development costs, being building and equipment combined constitute the biggest portion of costs.
On the side of recurrent expenditure, salaries and allowances for teachers takes the lions share of the costs. From the studies of Dr. Cumming of 12 schools offering industrial education in 1982, salaries and allowances of this category of staff constituted 50 per cent of the total recurrent expenditure of Kshs. 38.088/=

A similar trend of costs is observed in the case of development costs and recurrent costs in technical schools. A summary of SIDA funding of technical secondary schools is shown below :

SUMMARY OF SIDA FINANCED TECHNICAL SCHOOLS-COSTS COVERING 1975 DECEMBER-1983

CATEGORY OF EXPENDITURE	AMOUNT KSHS.
Building	93.637.757.80
Equipment	17.781.513.55
Furniture	2.848.979,70
Professional services	3.382.120,60
TOTAL EXPENDITURE	117.670.371,65

C. TECHNICAL AND VOCATIONAL EDUCATION IN THE 8-4-4 SYSTEM OF EDUCATION

INTRODUCTION

Human resources is the greatest development asset any nation can possess. Kenya's goal is that the labour force obtains gainful employment, but most modern economic activities require sophisticated technology and manpower with middle and high level of education and training. Nearly 85 per cent of Kenya's population lives and works in the rural areas. About 75 per cent of this labour force is engaged in farming and pastoralism and the rest in non-farm activities. The majority of the school leavers who enter the labour market are poorly equipped to take up opportunities for meaningful employment or self-employment due to inadequate technical and vocational training.

As Kenya moves into the 8-4-4 education system, the number of school leavers from both primary and secondary levels will increase significantly and will raise a high demand for a well articulated training system. The economy, both at the formal and informal sectors will likewise demand more and more skilled manpower, especially at the lower and middle levels as we seek to modernize rural life through the implementation of the new Government Policy on the District focus for Rural Development. In addition, we must aim at increasing the national training capacity by almost three fold as envisaged by the National Council for Science and Technology so that by the year 2.000 we may arrive at a ratio of 1 professional: 10 technicians: 30 craftsmen/artisans.

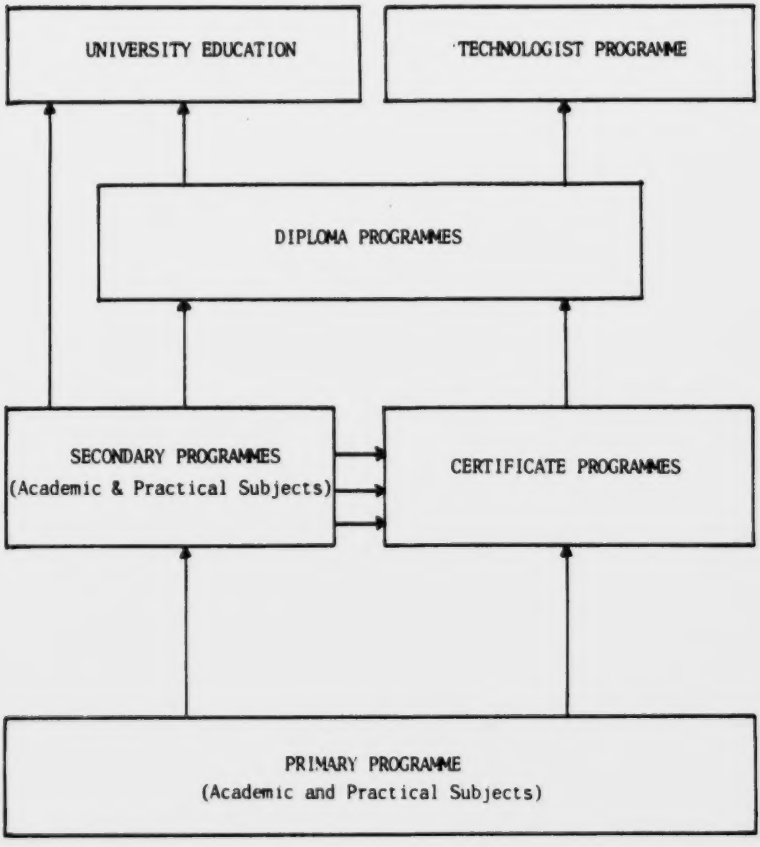
AIMS AND OBJECTIVES OF TECHNICAL AND VOCATIONAL EDUCATION

a) The main aims are :

i) To extend training opportunities, to meet the demands of those students who will terminate their formal schooling at the primary or secondary education cycles.

A FLOW CHART OF

TECHNICAL EDUCATION AND TRAINING PROGRAMMES IN 8:4:4



ii) To impart the necessary practical skills and attitudes as equipement for the individuals means to survival in the Kenyan society.

b) The general objectives of technical and vocational education at post-primary and post-secondary levels are to :

i) Provide increased training opportunities for the increasing number of school leavers, to enable them to be self-supporting in pursuit of earning a living through team-work and companionship or through individual initiatives.

ii) Develop practical skills and attitudes which will lead to income earning activities in the rural or urban areas through self-employment as skilled operatives, artisans, craftsmen, technicians in the formal and non-formal sectors.

iii) Provide practical education and training skills which are responsive and relevant to Kenya's Industrial and Commercial development.

iv) Provide the technical knowledge and vocational skills necessary for the rapid growth of this nation's agricultural, industrial, commercial and other economic development.

v) Provide people who can apply scientific knowledge to the improvement and solution of environment problems for the use and convenience of man.

To achieve the objectives of the 8-4-4 system of education, a new structure of technical and vocational education and training has been adopted. A flow chart of this structure is shown in figure II and a detailed explanation of the chart is given below.

SALIENT FEATURES OF THE 8-4-4 EDUCATION SYSTEM

The new system which came into force in January, 1985 means that children will spend 8 years in Primary Scools, 4 years in Secondary schools and for the lucky few, 4 years in the University.

There are advantages which accompany the new system. Firstly the additional year in primary school will allow children to be more mature physically than it has been the case before. This means that those who terminate their formal education after primary school will be old enough for the world of work or for job training opportunities.

Secondly the new system will provide three logical segmentations in the formal school system which will give ample allowance for curriculum diversification at each level of the formal education. At both primary and secondary school levels for example, this curriculum diversification will call for the introduction of practical subjects. The purpose of these practical subjects will not be to produce individuals who are qualified to pursue course-related professions upon leaving school, but to instil in the children an appreciation for skilled manual work, and to establish some of the basic skills required in a broad range of occupation. Each of these two segments of the formal school curriculum will be terminal. This means, in effect, those pupils who do not find a place in the next ladder of further schooling will be equiped with knowledge, skills and attitudes for vocational training or direct involvement in the world of work.

At the University level, the new system will allow room for broad based curriculum during the initial period of one's university studies and later narrowing to specialisation in professional or general degree qualification according to individual choice and inclinations.

The third advantage attributed to the new system is that it will allow the government ample opportunity to give a critical look at the whole area of vocational training with a view to tackling the endemic issues of unemployment of school leavers and the supply of technical manpower at various levels of national economy.

As it must be admitted, formal education in Kenya has expanded tremendously over the last twenty years. This quantitative expansion although desirable, has not been matched with the necessary training opportunities in the technical fields. The result of this great expansion of formal education at both primary and secondary school levels has been increased by the number of self-employment. At the same time, the country continues to lack technically qualified citizens in many fields especially at Artisan and craftsmen levels of qualification particularly those which are geared to rural development.

In order to cope with the problem of unemployement and technical manpower provision and especially in response to the district focus policy for rural development, the 8:4:4 system will seek to harmonise and rationalise vocational training programmes in all fiels.

As far as primary school leavers are concerned, it is envisaged that Youth Polytechnics and the Farmers Training Centres will play a major role of offering training for artisans in various trades. These institutions are strategically spread out in the rural areas of this country and are therefore most ideal places for rural-based artisan training programmes. At the moment, insititutions do not possess professionally articulated curricular nor are they adequately equipped. If they are to meet the future demands, the Ministry of Education Science and Technology is liasing with the parent ministries with the view to sorting out the issues pertaining to sorting physical facilities, staffing, curriculum, examinations and certification.

As it must be admitted, the success of the 8-4-4 structure of education will depend, to a large extend on the degree to which the rationalization and harmonization of vocational training is effected. This is specifically so as regards the Youth Polytechnics and Farmers Training Centres which have hitherto been viewed as places for the school failures and semi-illiterate adults. It is envisaged that, the future image of these institutions require to be improved in terms of their status and significance. They must be seen as centres of qualitative continous functional education geared to the socio-economic transformation of rural communities and the

consequent improvement of the quality of life in the rural areas. They must be seen as community based, and Harambee managed but nationally recognised institutions of vocational training. Unlike ordinary schools, these institutions can teach courses which are unit based and tailor-made to suit individuals and their particular situations. Such courses ought to be run throughout the year in such a way that everyday is both an admission day as well as a graduation day. This means that courses will be individualised; that they will be on community profiles and future expectations and aspirations of the clients.

It is only when courses are individualised, when the institutions remain open throughout the day and year, that more and more people can be trained according to their wishes as well as meeting the manpower demand of the economy.

These institutions can establish a break-through in the implementation of the concept of life-long education in a practical way. In this respect, each institution should be managed like a restaurant where the menu is a matter of individual choice and where both the time and the speed of eating are purely a matter of personal choice. Thus, like in a restaurant where services remain available throughout and at the whishes of the clients so must community technical institutions.

Part-time teaching should be encouraged in order to off-load the burden of work from the regular teachers. Such openings will also create worth-while activities for some of the vocationally qualified people who tend to spend their after-duty hours idling, in non-productive activities.

The nation can make positive utilization of such brains through the part-time teaching in the continuing education and training programmes which can easily be spear-headed by the Youth Polytechnic and similar training institutions.

As far as the secondary school leavers are oncerned, it is expected that there will be rigorous expansion and harmonization of Diploma Courses institutions throughout the country. These institutions will be known as

Institutes of Technology and they include the present Harambee Institutes of Technology, Technical High Schools and Secretarial Colleges. The harmonization will also include institutions under other Government ministries.

The expansion of training opportunities at this level is dictated by the sheer massive numbers of young people who will be terminating their formal education after four years of secondary school and who must be turned into skilled workers through training programmes of their choice and aptitude. The nation can ill afford to provide them with 12 years of schooling at public expense and then leave them without relevant skill training.

In addition to slotting secondary leavers into career training opportunities and on the basis of Aptitude Tests, the more able students among the artisans from the Youth polytechnics will be given chance to acquire advanced training in the service. Similarly technical diploma holders who show intellectual promise will be given opportunities to advance to the National Polytechnics as high as their abilities can allow.

In this way, training programmes of the future will have an inbuilt component for further advancement in order to keep pace with the rapid changes which are brought by the skill requirements in our technological world.

This is the plan for the future technical education which the Government belives must be put into force in order to pave the way for a positive march towards technological advancement and autonomy for the people and the Nation of Kenya.

TECHNICAL EDUCATION AND VOCATIONAL TRAINING

After 8 years of primary education and 4 years of secondary education, there will be outflows of students from the general education who require training in various vocational and technical education.

As indicated in the chart on page 33, the new technical education and training programme will provide opportunities for primary school leavers

at the post-primary training institutions (mainly the youth polytechnics). At this level, there will be proficiency skill development courses lasting 6-12 months and artisan skill development courses lasting two years. The students who successfully complete the artisan courses may proceed for craft skill development courses lasting 2-3 years in the youth polytechnics or in the middle colleges. Graduates of craft courses who wish to further their training and the majority of secondary school leavers will join ordinary Diploma programmes lasting 2 to 3 years and which will dominate the middle colleges. The ordinary diploma courses may further their training by joining Higher Diploma or Technologist courses in National Polytechnics or in the Moi Technological University for a duration of not less than 4 years.

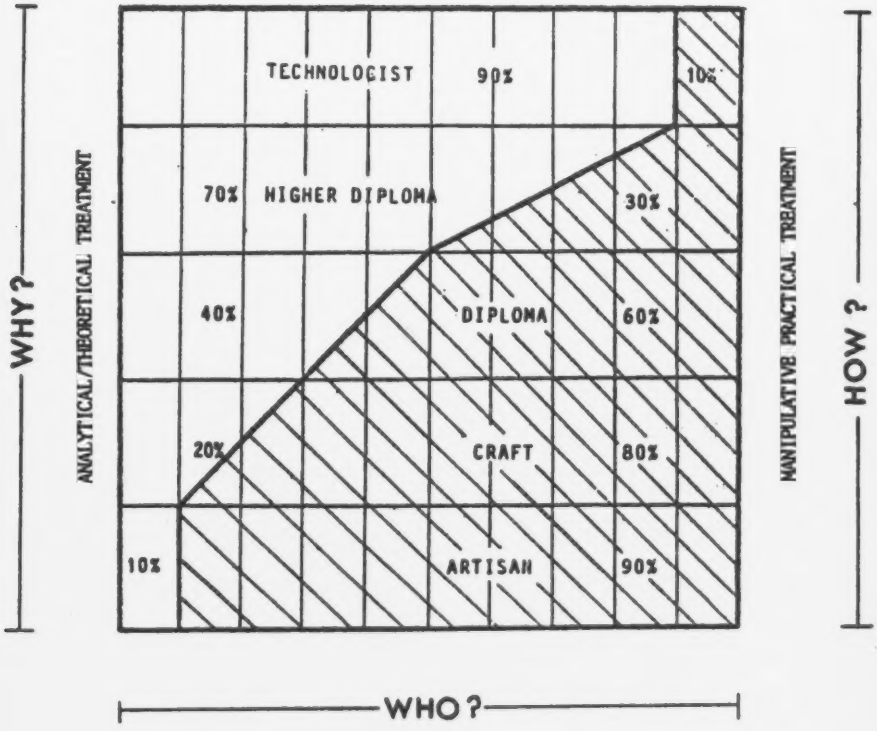
All the new curricula is to be restructured so that linkages are created to enable students to transfer from one programme to another where necessary through a credit granting system. Students who leave secondary schooling for one reason or another can be admitted into training institutions at an appropriate level for a programme of his or her choice and ability without loss of time.

Figure III entitled manpower training system shows the depth of theoretical versus practical treatment of each level of technical education and vocational training programme while figure IV on curriculum design and development for Technical Programmes shows the depth of decision-making or levels of responsibility associated with each level of technical education and vocational training.

The short courses last 12 months and the long courses last 24 months. The attendance pattern is flexible to cater for part-time, full-time, evening, block release or sandwich arrangements.

MANPOWER TRAINING SYSTEM

FIG. III



SHOWS : i) harmonization, rationalisation and linkages in the training programmes ;

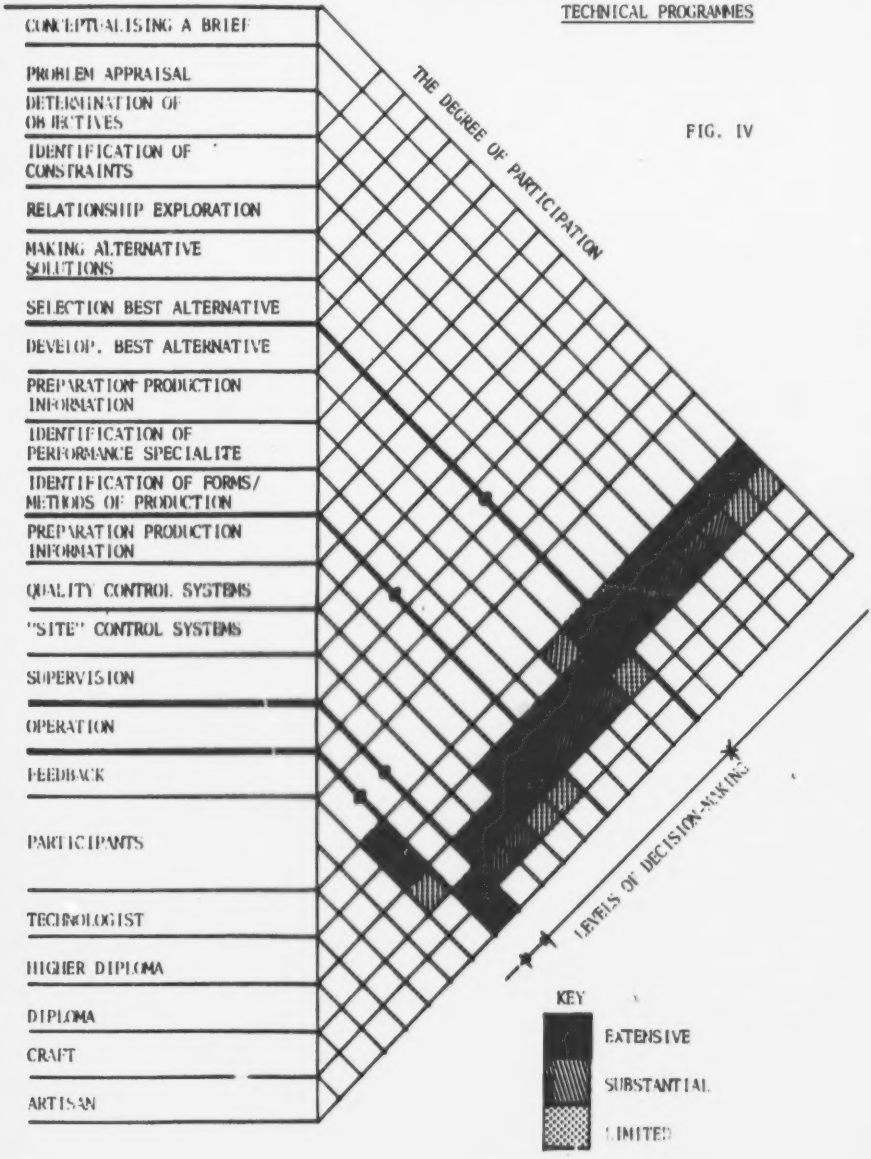
ii) the depth of theoretical/practical treatment in each programme.

iii) ☐ analytical/theoretical treatment ;

iv) ▨ manipulative practical treatment.

CURRICULUM DESIGN AND DEVELOPMENT FOR TECHNICAL PROGRAMMES

FIG. IV



D. DETAILED CURRICULUM ANALYSIS OF TECHNICAL EDUCATION AND VOCATIONAL TRAINING PROGRAMMES IN THE 8-4-4 SYSTEM OF EDUCATION

1. TRAINING FOR PRIMARY SCHOOL LEAVERS

This training will consist of the following three types of programmes at certificate level :

a) Proficiency skills certificate
b) Artisan skills certificate
c) Craftsmen skills certificate

The programmes will be in different courses specialisations but the depth and breadth of each course will be almost the same. The courses will be mainly technical and community based areas of study.

GENERAL OBJECTIVES OF CERTIFICATE PROGRAMMES

a) To provide training skills to primary school leavers of all ages.
b) To provide an avenue for life long education through continous up-grading of skills.
c) To provide vocational training which is directly linked to occupational competence for employment or self employment both in rural and urban areas.
d) To instil in the trainee an appreciation and dignity of manual work.
e) To develop entrepreneural skills
f) To develop relevant practical skills which lead directly to making valuable articles for income generating purposes.
g) To appreciate the significance of team work and co-operation in performing productive activities.
h) To provide a foundation for further training in relevant trade or occupations.

PROFICIENCY SKILLS CERTIFICATE COURSES

These consist of short courses, designed to meet short-term training demands. The training programmes are mostly practical with trainees spending nearly 100 per cent of their time performing practical tasks. The curriculum is tailor-made or is based on a particular community profiles. The ultimate goal of these programmes are to enable the trainee participate in income earning tasks through self-employment or wage employment especially in the non-formal sectors of the economy. In otherwords, these courses are part of extension services offered to potential or existing small-scale entrepreneurs.

The training duration ranges from one month skill upgrading to three, six or twelve months. The attendance pattern is flexible to cater for part-time, evening, block release or sandwich arrangements.

Some of the areas of study at the level of training include :

i.	Poultry keeping	iv.	Machinists
ii.	Retail shop selling	v.	Plumbing
iii.	Dressmaking	vi.	Vehicle servicing

ARTISAN SKILLS CERTIFICATE COURSE

These courses are intended to equip the trainees with useful vocational skills to enable them to perform routine tasks. The artisan receives assignements from a supervisor or craftsman who gives simpler instructions and makes clarifications or suggestions when necessary as work is performed. The purpose of these programmes is to enable the trainee to undertake activities which can earn him a living in the society.

The curriculum comprises 90 per cent of the time to be spent on acquisition of learning practical skills in a given trade and 10 per cent on related theoretical subjects such as General studies and Mathematics.

The short courses last 12 months and the long courses last 24 months. The attendance pattern is flexible to cater for part-time,full-time, evening, block release or sandwich arrangments.

Some of the study areas at this level include:

i) Carpentry and Joinery
ii) Masonry
iii) General fitter
iv) Clerk typist
v) Storekeeping
vi) Salesmanship
vii) Tailoring
viii) Food Production and Service
ix) Plumbing
x) Leather work
xi) Agricultural mechanics
xii) General Agriculture
xiii) Motor Vehicle Mechanics
xiv) Electrical installation
xv) Welding and Fabrication
xvi) Painting and Decoration

CRAFTSMAN CERTIFICATE COURSES

These courses are aimed at producing a person who can perform manipulative skills to an existing and consistent standard or specification with utmost efficiency and speed. The curriculum should enable him to acquire adequate practical skills plus an understanding of relevant science, mathematics, technical drawing, and technology in addition to basic decision-making know-how. The curriculum consists of 80 per cent practical skill acquisition and 20 per cent theoretical learning. The courses are to be of 2 to 3 years training duration but the attendance pattern will be flexible as for the artisan courses. Admission to these courses is open to secondary school leavers whos qualification is not very high and to holders of artisan certificates. Some of the study areas at this level include :

i) Mechanical Engineering
ii) Electrical Installation
iii) Motor vehicle mechanics
iv) Electronics
v) Accounting
vii) Storekeeping
ix) Masonry
x) Agricultural mechanics
xi) Welding and Fabrication
xii) Carpentry and Joinery
xiii) Plumbing
xviv) Garment Manufacture

2. TRAINING FOR SECONDARY LEAVERS

DIPLOMA COURSES

The curriculum for the diploma courses will be broad based in content to provide the trainee with technical education and training skills which are responsive and relevant to Kenyan manpower requirements at the middle level. These courses will offer an attractive avenue of tertiairy education to those who do not get a chance to join the university or to those who will have completed craft certificate courses. The 1985 cohort of pupils in standard 8 class will enter secondary school in 1986 and sit for their final examinations in 1989 and thereafter enter post-secondary training institutions in 1990.

The curriculum will be planned such that 60 per cent of the learning time will be spent on acquisition of practical skills while 40 per cent of the time will be spent on theoretical studies. The duration will be designed to last 2 to 3 years and to allow a flexible attendance.

Some of the areas of study at this level will include :

i) Mechanical Engineering
ii) Automotive Engineering
iii) Refrigeration
iv) Computer Science
v) Water Engineering
vi) Cartography
vii) Surveying
viii) Building maintenance
ix) Radio and Television
x) Banking
xi) Telecomunication
xii) Meat Technology
xiii) Farm Power and Machinery
xiv) Institutional Management
xv) Hotel Catering Services
xvi) Personnel Managment

HIGHER DIPLOMA/TECHNOLOGIST COURSES

The courses will be open to those who will have completed 2 to 3 years of relevant diploma. The curriculum for these courses will be designed to produce a person who is qualified by education and training plus industrial

experience to carry out professional services or apply scientific principles in solving management problems. The courses at this level are expected to produce a practical oriented person who can enter into direct employment or self-employment without addtional training at the place of work.

The curriculum will be designed such that 30-10 per cent of the training time is spent on acquisition of practical skills while 70-90 per cent of the time will be spent on theoretical/analytical studies. The duration of training is expected to last 2 to 3 years and will include part-time, block-release, sandwich, and full-time attendances.

Some of the areas of study at this level will include :

i) Mechanical Engineering Production
ii) Mechanical Engineering (Textiles)
iii) Mechanical Engineering (Plant maintenance)
iv) Electronic Engineering
v) Civil Engineering
vi) Electrical Engineering
vii) Agricultural Engineering
viii) Food Technology
ix) Water Engineering
x) Computer Science
xi) Transport Management
xii) Public Relations
xiii) Public Finance
xv) Financial Management
xvi) Banking
xvii) Organisation and Methods

3. IMPLEMENTATION OF THE NEW VOCATIONAL AND TECHNICAL EDUCATION CURRICULUM AND ITS IMPLICATION ON PRODUCTIVE WORK

The long term aim will be to design modular (unit based) type of curricula which can be adopted to programmed learning, correspondence studies

or flexible attendance pattern. The training curricula will comprise of a given number of phase-tests of practical projects which an individual student will have to complete before proceeding from a lower stage to a higher stage.

Every institution will be encouraged to establish a production unit. The production units will serve the following purposes:

a) To provide a facility which can be used to expose trainees to real industrial work situation or practical experience within the proximity of the training institution.

b) To produce valuable articles or services which can be sold to earn the institution some revenue to enable it to be self-reliant or self-supporting. The production unit should be able to operate commercially such that it is able to compete effectively with other commercial firms in the local areas in soliciting for contract work to schools, co-operative societies and government institutions.

c) The revenue form the proceeds of the production unit should help to subsidise the fees paid by trainees who provide it with services in terms of labour and professional services.

It has already been mentioned in Part III Paragraph B that the 4-year curriculum which was introduced in technical secondary schools in 1970 was academic-based and emphasised examination performance. This curriculum did not prepare students adequately for direct wage or self-employment. It is because of this reason that the Government of Kenya decided to phase-out this 4-year curriculum and replace it with a training-based curriculum. In January 1986, the 19 technical secondary schools will not admit Form 1 students. Instead these schools will admit students for a two-year artisan certificate courses. The trainee who completes the two-year course successfully will continue with a new training-based programme leading to 2 to 3 years of craft certificate courses.

In 1990, secondary school leavers will be admitted into these 19 institutions for the new diploma courses. The school leavers will consist

of the first cohort of 8:4:4 system of education who joined standard 8 in 1985. 1989 therefore will be the last year when the academic-based curriculum in technical secondary schools will be taught. However, a recent survey of the physical facilities in these institutions has established that :

a) the available facilities would not be adequate for the post-secondary training programmes. Additional equipment will be required. Rennovation and improvement of buildings will be needed ;

c) available teachers are not adequately qualified to hand post-secondary training programmes.

The artisan certificate courses will feature prominently in youth polytechnics, community training centres and in national yout service training centres. These institutions will however require better qualified teachers and additional equipment.

The craft certificate and diploma courses will feature more in Harambee institutes of technology, privately owned training colleges, individual Government Ministries, and in colleges of religious and charitable organisations. On the other hand, the Diploma and Higher Diploma/Technologist courses will be mainly offered in National Polytechnics and in the training institutions managed by various Government Ministries and Parastatals.

E. TYPES AND ORGANISATION OF PRODUCTIVE WORK PROGRAMMES IN K E N Y A

This chapter will cover in general terms a variety of productive programmes as well as selected case studies representing different types of productive work programmes existing in Kenya. However, before discussing any types of programmes, it will be necessary to highlight the features and provisions of Kenya's apprenticeship law since a good number of participants in these programmes work under the apprenticeship scheme.

APPRENTICESHIP LAW

The apprenticeship law as it existis in Kenya is contained in the Industrial Training Act Cap. 237, Laws of Kenya. The 1979 edition gives the following definitions related to apprenticeship :

a) "apprentice" means a person who is bound by a written contract to serve an employer for a determined period of not less than four years, or such lesser period as the National Industrial Training Council shall determine with a view to acquiring knowledge, including theory and practice, of a trade in which the employer is reciprocally bound to instruct that person;

b) "indentured learner" means a person, other than an apprentice, who is bound by a written contract to serve an employer for a determined period of less than four years with a view to acquiring knowledge of a trade in which the employer is reciprocally bound to instruct that person ;

c) "minor" means a person under the age of 15 years ;

d) "surrender" means a schemme made to regulate the training of apprentices or indentured learners in any given trade as per the Act ;

e) "trade" means a skilled occupation.

Section 8 of the Industrial-Training Act defines a person who may bind himself as an apprentice or indentured learner in any trade of occupation as any person who :

a) has attained the apparent age of 15 years ; and
b) has completed any period of compulsory education required by law; and
c) has, in the case of a trade or occupation in respect of which a scheme has been made, the qualifications prescribed under that scheme ;
d) has been certified medically fit by a medical practitioner as provided by Section 10 of the Act.

This section further states that a minor shall not bind himself as an apprentice or indentured learner except with the consent of his parent or guardian, with the consent of a District Officer or Labour Officer. A minor with such consent shall be bound by the contract throughout ist currency notwithstanding that he may have in the meantime attained his majority. During the contract the law prohibits any conditions relating to payment of wages to an apprentice or indentured learner based upon the quantity of work done or working overtime for persons under 17 years of age. However, on satisfactory completion of the contract, the employer is required, at the request of the apprentice or indentured learner to make out a certificate of apprenticeship or indentured learnership.

Some of the training schemes under the Industrial Training Act cover the following industries :

- Building and Civil Engineering
- Motor Engineering and Transport
- Printing, Publishing and kindred and allied industries
- General Engineering and Metal Manufacturing
- Power and Telecommunication
- Sawmilling, Timber and furniture
- Textile
- Chemicals, cement and pharmaceuticals
- Food processing
- Plantation

1. AN OVERVIEW OF PRODUCTIVE PROGRAMMES

Alongside the formal and informal vocational and technical education programmes, there exists a number of productive programmes which range from artisan to technician skill requirements. The National Youth Service training scheme with its 7 training centres spread throughout the country offeres a good example of productive programmes, based mainly on artisan and craft skills.

The National Youth Service which was started by the Government of Kenya in 1964 is the largest single scheme that offers training opportunities for young people, the majority of whom are primary school leavers. The objectives of the service is to train people to acquire skills useful to themselves and the community. Once recruited into the service, the boys are sent for a three months induction course at Gilgil, 60 km from Nairobi while the girls undergo a similar training at the nearby Naivasha. After the initial training the servicemen and servicewomen are engaged on non-paying national work for about a year including such activities as the building of roads, bridges, canals, air-fields, working on public farms, starting new public farms, and clearing bushes as part of the anti-malaria campaign. On completion of this course, they are selected into various training programmes within the National Youth Service centres.

The small scale industrial development programme sponsored by the Kenya Industrial Estates (KIE) is another example of productive programmes which can be classified under the non-formal categories of vocational and technical education.

The focus of training is on imparting business management know-how to the small scale industrialists in urban and rural areas.

Short-tailor-made courses are organised in various districts throughout the country designed to meet the different needs of various industries. The objectives of this small-scale development programmes are :

a) To provide management training for small sized business enterprises in the country.

b) To provide management extension and advisory services to entrepreneurs of small scale businesse in urban and rural areas.

c) To provide research and information services to small scale industrial entrepreneurs.

d) To assist small businessmen both technically and financially in introducing simple business methods and techniques, systems and controls. The assistance is provided in form of cheaply rented premises, and capital to buy equipment and tools. The industrialists only contribute working capital which constitutes about 15 per cent of the total capital outlay. Therefore, the Kenya Industrial Estates LTD provides an avenue for trained craftsmens and technicians to engage in self-employment or in wage employment.

This programme is implemented through three levels of operation, i.e. Industrial estates which are situated one in each of the 8 Provinces in the country, rural industrial development centres, one in district headquarters and in less developed areas, the industrial promotion areas. There are currently a total of 20 estates and centres. These levels are developed as follows:

- An industrial estate, which is usually located close to a large town (usually provincial headquarter) comprises an Administration block, a number of factory premises and a technical services centre, where technical assistance is made available to the operating industries.

- Industrial promotion areas which are usually located in less developed areas comprises a cluster of low cost sheds housing small industrial projects which are closely related to the needs of the area.

- A rural industrial development centre which is usually located near a smaller town (usually district headquarter) comprises an Administration block and small factory units, together with a technical service centre or workshops.

The entrepreneurs rent the factories from the K.I.E. and with the assistance of K.I.E. loans, 85 per cent of total capital, set up manufacturing units or produce and market products for the local market and in some cases, for export.

Each of the estates or centres is staffed by a core of professional staff, consisting primarily or economists, accountants and engineers backed by clerical, technical and other service personnel. The project officers identify new entrepreneurs and improve the efficiency of existing entrepreneurs through short training courses. Extension officers act as consultants, advisers and as trainers of entrepreneurs in co-operation with institutions such as Kenya Institute of Business Training and the Kenya Industrial Training Institute.

Specifically, K.I.E. assists new and upcoming industrial entrepreneurs in the following ways :

a) Planning and appraisal of industrial projects.
b) Provision of industrial premises at subsidised rent rates.
c) Provision of finance by giving loans.
d) Assistance during implementation of projects.
e) Provision of repair and tool manufacture facilities at its technical services centres set up in each industrial estate and rural industrial development centre.
f) Provision of extension services on Management, Technical, Marketing and bookkeeping problems through consultancy service provided by resource personnel.

When K.I.E. first started operating in 1978, the basis of assistance for entrepreneurs consisted of the provision of a factory at subsidised rental plus a loan of up to a maximum of 85 per cent of the total capital requirement, at a low rate of interest. It also gave legal assistance towards commissioning and installing machinery for the purpose of production. The K.I.E. assumed that an abundant supply of potential entrepreneurs would immediately approach it with business ideas ready to transfer their Managerial ability to the Mana-

gement of business. Later, K.I.E. realised that this assumption was wrong because there had been no previous tradition of entrepreneurship, least of all in the rural areas of the country. K.I.E. realised that training was required. Prospects for establishing small businesses in Kenya do not only entail setting up entrepreneurs in business, but also involve setting them up where they are most needed and most desirable. The biggest problem is not the promotion or development in the big cities and urban towns; but development in the small rural towns and opening up remote areas of the country. The vast majority of those who have entrepreneur ability are non-starters because they lack the opportunity of being trained in the relevant business techniques and skills, and without such training, talents will remain dormant and the potential for contributing to economic development would remain under-utilised while unemployment continues to rise around them. It is for this reason that K.I.E. is providing entrepreneurs with training through seminars in finance, management and marketing.

2. PROJECT WORK IN TECHNICAL SECONDARY SCHOOLS AND INDUSTRIAL EDUCATION SCHOOLS

Project work whether for technical education or industrial education is a useful tool in the teaching of practical subjects. It is intended to assist the learner to be able to :

a) Support, broaden and supplement his learning experiences.
b) Develop a co-operative attitude of responsibility towards others.
c) Display more realistic profils of learning abilities and qualities.
d) Display his personal qualities such as leadership and willingness to work.
e) Develop his power of communication.
f) Display individual initiative and show genuine personal effort.

In the technical education system, project work is used extensively. The type of work done by the trainees is varied due to a number of factors:

these being the nature of the course and its level, material costs and the potential of the project for performance measurement.

Technical discipline as taught in our institutions are extremely varied covering many of the vocational trade areas. In the majority of these a single physical object or a number of objects can be made by the trainee. The quality of the project is then assessed using a marking schedule in order to measure the skill level of the individual. The type of projects made range from useful articles such as stools, tables, spanners, cupboards, chairs and machines to the non-functional end tests such as masonry walls, stepped shafts and single joints which are assessed then destroyed. They may also include designing any of the above items including parts of a building.

A different type of test is that where psyco-motor skill is measured through observation by an external examiner i.e. Motor vehicle engine timing or the testing of an electrical circuit. Obviously, in these cases nothing physical is produced and the training cost is minimal, it is however restricted to certain individual trades.

The application of project work and its use for examination purposes is dependant upon the individual course regulations.

For example, the current technical school pupils are externally assessed on course work and awarded an 'O' level grade on their level of performance. To achieve this they produce on average six projects known as 'phase tests' over a two year periode, i.e. terms 3 and 4.

The industrial Education pupils complete a major project which can take up to one term and its value for examination purposes amounts to 50 % of the final examination marks.

In the higher level courses, more complex projects are made. These however, rarely account for more than 30 % of the final examination marks.

The organisation and administration coursework is done at different levels and the bodies involved include the Kenya National Examinations Council (KNEC) which set and assess projects, the Inspectorate of the Ministry of Education, Science and Technology and various post-secondary institution which monitor ongoing coursework ensuring marks are submitted for grading purposes.

At secondary or post-primary level the project work is the K.N.E.C.'s responsability. However, at post-secondary course level, project work is controlled by the institution concerned, although it can be externally assessed by examiners appointed by the K.N.E.C.

Projects are vary costly, these range from Ksh.1 to over Kshs. 190 per unit and are met by the Grants ain Aid, given bu the Ministry of Education, Science and Technology. Materials are supplied from K.N.E.C. and charged to pupils/students depending upon the course. At the present time few if any of the course projects are sold although where pupils contribute to the to the cost (in industrial Education) they are permitted to retain the project after assessment.

In conclusion, it is important to state that a great deal of care should be taken to find a balance between project and production work. Whilst production work can have obvious financial benefits to both the trainee and the institution, it can also create a number of problems. For example, too much emphasis on production work will be at the expense of the variety of skills taught to the trainee. Furthermore, where trainees are used prematurely, expensive mistakes can result with an additional loss of credibility to the institution.

It is also important to note that the national polytechnics and the technical secondary schools when they become converted into technical training schools will introduce production work at the commercial level in the same way as the Harambee Institutes of Technology and Youth Polytechnics are currently doing.

3. CASE STUDY NUMBER ONE

KIRINYAGA TECHNICAL INSTITUTE

Kirinyaga Technical Institute is the only Harambee Institute of Technology in Kirinyaga Distric. This institute is situated at the junction of Sagana Embu and Sagana Kerugoya Roads, approximately 100 km from Nairobi.

Kirinyaga Technical Institute opened its doors to students in 1977. It occupies a piece of land measuring approximately 250 acres and has a total enrolment of 310 students who are boarders. It offers Clothing Technology and Building construction courses.

Some useful statistical data about this institute is outlined below :

a) ENROLMENT PER COURSE

Course	number of students
Clothing Technology (3 year course)	106
Building construction (3 year course)	204
Total	310

b) STAFF

Category	number
Teaching	26
Non-teaching	30

c) INSTITUTIONAL FARM UTILISATION

Type of farming	cultivated land
Citrus fruits	10 acres
Mature coffee	60 acres
Maize	20 acres
Horticultural crops	4 acres

Learning in this institute consists of 70-80 per cent practical work and 20-30 per cent of theory and analysis. Models and simulated situations are used to facilitate learning to beginners classes.

The Productive Programmes in this institute consist of :

a) Construction
b) Carpentry Production Unit
c) Tailoring Workshop
d) Institute farm

All the above programmes except the farm started operating on commercial basis in January, 1984. The farm is the oldest and started operation on commercial basis in 1974.

CONSTRUCTION FIRM

This programme consists of a staff of 10 employees working under a project manager. These employees were former trainees of the institute. This firm bids for tenders offered in the district. It has built a secondary school library and classrooms and a bible school for Kshs. 540.000/= .

For the institute it has build the following :

i) Electrical workshop
ii) Plumbing workshop
iii) 11 staff houses - Grade D
iv) Coffee factory

The total value of contracts undertaken by this firm in 1985 amount to approximately Kshs. 3.000.000/= . The profit margin for projects taken by this firm is 7-10 per cent. This programme is becoming fairly attractive for schools, co-operative societies and government institutions because of its low charges.

CARPENTRY PRODUCTION UNIT

This programme consists of a staff of 4 employees and a supervisor, all of whom were trainees of the institute. This unit in 1985 won tenders to supply furniture to one financial institution, a religious community centre, and one hotel all in the local district. The total value of contracts for furniture supply in 1985 is Kshs. 560.000/= . The net profit margin for the projects carried under this programmes is 5 per cent.

This programme has not attracted many customers because the ordinary members of the community are generally poor and cannot afford to buy the high quality furniture made at the institute, although the prices are relatively low. The institute is planning to look for a market for its furniture in Nairobi.

The raw materials for furniture is cheaply obtained from the locality.

TAILORING WORKSHOP

This programme has 12 employees and a manager. It deals mainly with supplies of uniform to schools and co-operative societies. In 1985, it had orders for over KShs. 880.000/= and it is very popular with local community because its products are comparatively cheap. The local administration has promised to offer all tenders for supply of uniform to Government Institutions in the District to this institute. The profit margin is about 16.6 per cent.

INSTITUTE FARM

This is the oldest and largest programme at the institute. The Trustees of the institute wanted the farm to be run by students as a source of income to raise proceeds and thus subsidize and sustain running costs. The income from this farm is supposed to purchase tools to leaving students. The trustees wanted to avoid seeking for financial contributions from the public for recurrent expenditure. Students have their own clubs and each club has a piece of land where they cultivate crops for sales to the institute. In

1985, one club sold vegetables worth KShs. 8.000/= to the institute. In addition, students harvest coffee, weigh it and they are paid for the labour contributed. A total revenue of KShs. 1.500.000/= is made each year.

BENEFITS OF THE KIRINYAGA TECHNICAL INSTITUTE'S PRODUCTIVE WORK PROGRAMMES

The projects carried out under the 4 programmes in this institute have a number of advantages :

1. The projects act as a learning facility to expose trainees to real world of work in the various trades offered in the institute.

   Trainees do their practical attachment by participanting in the commercial projects undertaken either by the construction firm, carpentry production unit and the Tailoring workshop. In the absence of such projects, it would have been difficult to organize practical attachment to students of this institute since it is situated in a rural area where there are large industries for such an attachment.

2. The projects are useful in the sense to generate income which is used to subsidize the running costs. These projects are therefore meant to make the institute self-reliant.

3. The trainees who participate in these projects have too advantages :

   a) The proceeds from the farm are used to buy them tools to take away when they graduate.
   b) The income from the other projects is shared between the institute and the trainees. The portion of the income for the trainees is used to pay part of the fees. Consequently the final fees paid by the trainee at present is only KShs. 3.900/= per year. Fees in similar institutions in Kenya which do not have this type of productive programmes ranges between KShs. 4.500/= and Ksh. 6.000/= per year.

4. The institute has employed more than 30 former trainees in the projects. Thus the projects have helped to create employment opportunities.

PROBLEMS EXPERIENCED AT THE INSTITUTE

The institute requires personnel and equipment to enable it to perform the following tasks which would enable it to achieve more in its productive work programmes.

a) Facilities and personnel to research on quality control and production techniques
b) Facilities and personnel for market research and marketing of its products and services
c) Maintenance services for its equipment
d) Food processing equipment for its farm products especially the perishable ones.

4. CASE STUDY NUMBER TWO

KIMATHI INSTITUTE OF TECHNOLOGY

This institute is located in Nyeri District of Central Province. It started operating in 1981 and has a total enrolment of 296 students comprising the following :

COURSE	number of students		
	1st year	2nd year	total
Masonry	23	24	47
Carpentry	23	22	45
Plumbing	22	21	43
BUSINESS STUDIES			
CPA 1 Sec. 2	31	-	31
CPA 1 Sec. 1	32	-	32
ACNC	98	-	98
	Grand total		296

PRODUCTION WORK

1. After 3 terms of a six term (2 year) course, plumbing students go for a 3 months practical attachment work in institutions which are situated within the locality which include :

   a. Mt. Kenya Bottlers LTD
   b. Nyeri Municipal Council
   c. Ministry of Works, Housing and Physical Planning - Central Province

   During the practical attachment, students perform a wide variety of practical work just like full-time employees. The purpose of this attachment is to expose the students to the real work situations. The students are not paid any money for the work they perform while on attachment: instead the institute is responsible for the financial

requirements of the students. The institute's instructors supervise the attachement but are assisted on day to day activities by the officers in charge in the institutions where the students are attached. Often,the students who complete their part III of plumbing get employmant in the institutions where they did their practical attachment. While at the institute, the students :

1. participate, performing plumbing tasks during the construction of classrooms, workshops and dormitories. Details of this will be given later.

2. The institute has a large farm of over 4 acres where it grows coffee, and rears livestock in an effort to make it self-sustaining financially.

3. Students who do masonry and carpentry do not undertake practical attachment outside the institute. Instead, they make learning models such as those of furniture, parts of buildings and whole buildings and undertake projects within the institute such as construction of classrooms, dormitories, workshops under the supervision of a project manager and institute's instructors. To date, students have completed the following projects :

   a. Construction of permanent 6 classrooms each capable of accommodating 24 students at a rate of 2 classrooms each year.

   b. Construction of 2 large permanent masonry workshops, measuring approximately 200 ft. x 40 ft. at a rate of one workshop each year.

   c. Construction of one large permanent dormitory with double-bed cubicles for 48 students. Plumbing students take part in the construction of these buildings. Carpentry students have started to make furniture for sale. The institute is planning to compete for contracts for supply of furniture and construction services.

The savings made through this programme helped to reduce the amount of fees paid by students. The fees charged by this institute is approximately 4.000/= per year which is about 2.000/= lower than what is charged by those institutes of technology which do not have any productive programmes.

It is important to note that students of business studies courses do not engage in productive work. When the students in the Masonry, Carpentry and Plumning courses undertake commercial contracts, the business studies students could easily be involved in Market Surveying, Marketing, actual selling of products and services as well as maintaining accounts records.

PRODUCTIVE WORK PROGRAMMES IN OTHER HARAMBEE INSTITUTES OF TECHNOLOGY

The 15 Harambee Institutes of Technology have achieved different degrees of development in their productive work programmes. These institutes are also at different stages of development as outlined below :

1. Institutes which have developed to their planned capacity.

   a. Kiambu Institute of Science and Technology
   b. Rift Valley Institute of Science and Technology
   c. Muranga College of Technology
   d. Sangalo Institute of Science and Technology
   e. Kirinyaga Technical Institute
   f. Kaimosi Friends College

Of these, Rift Valle Institute of Technology has the largest area and biggest enrolment. All these institutes except Kaimosi Friends College have a large farm and a production unit mainly engaged in building construction and which is operating commercially within the locality. In 1979, Kiambu Institute of Science and Technology had annual income of Kshs. 566.440/= from its workshop production.

The main productive work projects include :

a. Coffee Farm occupying about 35 hectares
b. Carpentry production unit
c. Construction Firm
d. Appropriate Technology production unit

2. INSTITUTES WHICH ARE NEARLY DEVELOPED TO THEIR PLANNED CAPACITY

a. Kimathi Institute of Technology
b. Western College of Arts and Applied Sciences
c. Ramogi Institute of Advanced Technology

The production units in these institutes are at their formation stage and have therefore not started operating commercially. Kimathi Institute of Science and Technology is the only one with a large farm in this category of institutes.

3. INSTITUTES WHICH ARE JUST DEVELOPING

a. Coast Institute of Technology
b. Gusii Institute of Technology
c. Ukamba Agricultural Institute
d. Meru Institute of Technology
e. Moi Institute of Technology

Production work programmes have not yet started operation.

4. INSTITUTES WHOSE PREMISES ARE UNDER CONSTRUCTION

Embu College of Technology

5. PRODUCTIVE WORK PROGRAMMES IN YOUTH POLYTECHNICS AND COMMUNITY CRAFT TRAINING CENTRES

It has already been said that the Youth Polytechnics and community Craft Training Centres were established to train primary school leavers throughout the country in basic vocational skills so that they can perform useful, productive work for remuneration in the local community. In addition, to giving courses in the conventional areas of carpentry, masonry and tailoring, these institutions often attempt to create new local industries by offering instruction in new lines such as cloth printing, bee-keeping or bread-making. They have encouraged their graduates to form co-operative societies for construction of cheap permanent and semi-permanent buidlings including class-rooms for the local schools as well as supplying furniture for schools and governmental offices.

Some of the institutions which have successfully encouraged their graduates to set up local industries or to form a co-operative societies which compete for contracts on commercial basis include the following :

	NAME	DISTRICT
1.	Maseno Youth Polytechnic	Kisumu
2.	Kianjai Youth Polytechnic	Meru
3.	Karatina Youth Polytechnic	Nyeri
4.	YMCA Craft Training Centre	Nairobi
5.	Christian Industrial Training Centre	Mombasa

The degree of success of a particular institutions no doubt depends very much on local leadership and local conditions.

For example, in 1979, the christian Industrial Training Centre - Nairobi made an annual earning of KShs. 80.000/= from sales of products, less cost of materials and engaged labour, and 15 per cent of its total expenditure on equipement. Production ranges from wheelchairs and furniture to solar water heaters and windmills. In addition, almost all the building extensions at the centre have been carried out by students. This centre together with 3 other similar centres offer good examples of cost-cutting and revenue-earning ingenuity in action.

6. CASE STUDY NUMBER THREE

TOOLS MAKING PROJECT

One of the biggest problems experienced in introducing and expanding craft and technician courses is the high cost of acquiring the necessary equipment and tools which are normally imported. The cost of maintaining and replacing thesetwo items especially with the high inflation experienced in the devoping countries has proved a considerable handicap. The importation of these items creates a drain on the meagre foreign exchange resources.

The importance of good, well maintained tools and an ability to handle them, greatly enhances the craftsman's skills and his productive capacity. An ability to make his own tools is of a great advantage to a craftsman as in producing such tools, a craftsman develops intimate attachment to them, increases his precision skills, and more importantly, produces them to fit his hands and conditions of production. The ability to produce one's tools is particularly important to the rural craftsman as it removes his having to depend on factory-made implements, while allowing for savings. From the economics point of view, making tools locally would not only save foreign reserve, but would also reduce he dependence on foreign-manufactured implements.

The need to have tools made locally is partly being answered by the ongoing tool-making project, which has been in operation in Youth Polytechnics since mid 1983 *.

PROJECT GOALS OF YOUTH POLYTECHNIC TOOLS - MAKING PROJECT

Despite continued supply of tools to Youth Polytechnics by both the Government and NGOs, they have not yet reached a point of self-sufficiency in this area. After training, each trainee is expected to receive a complete tool-kit from the Youth Polytechnic in order to assist him to get started as

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* Action Aid-Kenya - The Tools Making Project 1983/84 Report ; Nairobi, April 1985.

a producer. This goal has however not been achieved mainly due to shortage of resources experienced by these institutions. In 1983 the NGOs decided to carry-out a project for training instructors in Youth Polytechnics in the art of tool-making as a long-term solution to the problem of insufficiency of tools facing these institutions year after year. The project was headed with Action Aid as the implementing agency. Financial contributions were initially made available by the Danish Volunteer Service which provided a trainer, CARE-Kenya which provided a vehicle and a motor-cycle for the trainers and Action Aid which underwrote the recurrent expenditure for the first few courses. Further funding has since been provided by the European Economic Community.

The courses are initially based on a set of manuals produced by ILO-SDSR. Encouragement is however given to instructors to come up with their modifications or new decisions. The new ones are adopted in succeeding courses. The models are continually updated and kept towards the completion of a manual which can be distributed widely.

TOOL-MAKING TRAINING COURSES

During the 1983/84 financial year, four courses were successfully organised and run covering 19 items of carpentry tools. The courses were run on a residential basis in the Youth Polytechnics. Each course admitted 10 carpentry instructors. The training duration of each course is 5 weeks at the end of which each participant completes a basic tool kit consisting of the following items :

1. Working Bench
2. Sash Clamps
3. Bench Vice
4. Bench Hook
5. Mitre Box
6. Marking Knife
7. Centre Finder
8. Bow saw
9. Coupling Saw
10. Hack Saw

11. Mallet
12. Window Remover
13. Jacket Plane
14. Rebate Plane
15. Plough Plane
16. Mortice Gauge
17. Bevel Square
18. Try Square
19. Bradawl
20. Wood Turning Lathe cum circular Saw

The raw materials used are obtained from the timbers available within the local areas. This is in keeping with the aim to encourage the use of locally available resources.

The last week of the course is spent testing the tool-kits by using the tools to make items of furniture in order to fully convince the participants that the tools do actually work as well as (and at times better than) the mass produced ones.

After the completion of the testing of the tools, a planning session is held. During the planning, each instructor makes a plan as to how he will dissemanate the skills acquired, particularly how he will organise the curriculum to include all the tools during the years that trainees take to gothrough the youth polytechnics. The last day of the course is a public occasion at which a highly placed government officer officiates the closure of the course. Members of the youth polytechnic management committees from the district where the course takes place, including chiefs and government officials and other opinion leaders are invited to view the tools and see the demonstrations at work. This occasion is used to spread the awareness among the members of the public that the tools-making skills exist in their area and to demonstrate the fact that by using locally available materials, more can be done to create a measure of self-sufficiency.

During the 1983/84 financial year, 42 instructors from the youth polytechnics (in six districts shown in the map on page 65 and one education officer from the Ministry of Education were trained. The Ministry of Educat'on

sent in this officer to be trained with a view to testing the viability of introducing tools-making courses in primary schools and teacher training colleges. Discussions are going on within the Ministry to decide how best these courses can be organised.

Below are details regarding each of the 5 courses :

A. CARPENTRY TOOLS - MAKING COURSES

	COURSE	NUMBER OF INSTRUCTORS	NAMES OF YOUTH POLYTECHNICS WHERE INSTRUCTORS CAME FROM
1.	Pilot course June-July 1983	3	- Mangu - Ndunyu Chege - Kyuso C.R.C.
2.	1st course January-March 1984 at Mangu Polytechnic- Kiambu District	9	- Kirenga - Kirangari - Karatu - St. John Bosco - Nyandarua - Nderi - Thogoto - Nyaga
3.	2nd course April-May 1984 Ndunyu Chege Youth Polytechnic in Murang'a Distric	12	- Mangu - Kieni - Karuru - Kangare - Gatara - Kagundui-ini - Muyeka - Kanyuira - Makuyu - Muthithi - Kangema - Directorate of Basic Education
4.	3rd course July-August 1984 at Nkubu Youth Polytechnic in Meru District	11	- Githongo - Marimanti - Nkubu - Kirua - Ruibi - Maua

			- Muthara - Kianjai - Chuka - Kanyakine - Musa Nguruki
5.	4th course October-December 1984 Mogotio Youth Polytechnic in Baringo District	11	- Kituru - Baringo - Kabimoi - Ochii - Nginyang - Marigat - Mogotio - Subukia - Mai-Mahiu - Nakuru - Chepkorio

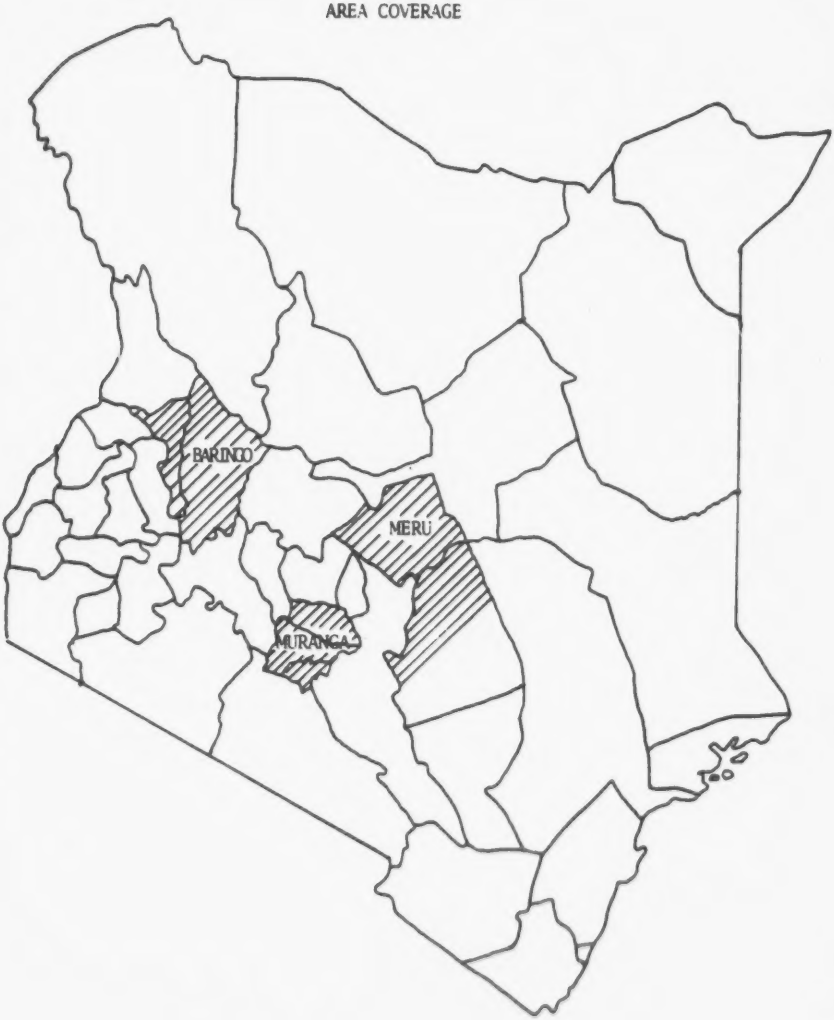
Metal-Work tools making courses

In the original proposal, it was anticipated that 20 metal work instructors would be trained in two courses each taking 10 instructors.

This was not possible as a trainer for metal-work was not found. Request have gone out to various volunteer services. It is anticipated that a trainer will be found before the end of 1985 and that the two courses will be held before the end of the year. The purpose of these courses is to spearhead the expansion of the training to include a wide range of implements from scrap metals.

TOOLS-MAKING PROJECT

AREA COVERAGE



B. TOOLS MAKING COURSE EXPENDITURE 1983 - 1984

The original recurrent costs were anticipated at KShs. 120.000/= for each metal-work course and KShs. 85.000/= for carpentry course. The actual cost for each carpentry course was an average.

LARGE SCALE IMPLEMENTATION OF TOOLS MAKING PROJECT

As at the end of February, 1985, 15 youth polytechnics had already set the process of including tools-making programme into their two year curriculum and were already implementing it. Another 7 polytechnics were in the process of including the programme in their curriculum; the reste experiencing difficulties such as shortage of funds, materials and being too busy fulfiling building contracts that youth polytechnics had undertaken.

Towards the end of 1985, a mid-term evaluation exercise was carried out to assess the usefulness and impact of these courses and to reshape the overall plans accordingly.

7. PRODUCTIVE WORK PROGRAMMES IN NATIONAL POLYTECHNICS

At present the three existing national polytechnics in Kenya have not seriously engaged in productive work programmes. The few productive work programmes found in these institutions are coincidental. Examples of these coincidental programmes are those found in the Graphic Arts Department and in the Institutional Management Department at Kenya Polytechnic.

The Graphic Arts Department prints all certificates issued by the college. It also prints , invitation cards, general forms, letterheads and envelopes as well as the prospectus of the institution. The services provided by this department constitute a significant cost-cutting contribution.

The institutional management Department operates a restaurant which is open to the senior staff and members of the public three days a week. It is well furnished and students prepare and serve three-course meals

at very low prices basically to meet the cost of cooking and raw-materials while the project provides real-life catering experiences for institutions management students, it provides a cheap service within close proximity to members of senior staff who could have otherwise travelled quite some distance to get the same service at higher costs. The revenue from this project again helps to cut-down on the operation expenses of offering institutional management courses.

The other departments of these institutions could easily start-off some revenue-earning and costs-cutting projects using the equipment and know how already available at the institutions.

F. 1. TRACER STUDIES ON TECHNICAL EDUCATION IN KENYA

It has already been stated in this paper that the aim of technical education is to provide a broad foundation of practical/technical skill and related theory, for further and specialized training after the completion of the course. The course is intended as a preparation for craft and technical courses.

The Directorate of Industrial Training, of the Ministry of Labour offers the largest training opportunity of graduates from Technical secondary schools for craft and technician apprenticeship courses. Those who undergo the craft and technician apprenticeship courses are absorbed in the private and Government sectors.

Training opportunities to these graduates are also offered by the following institutions :

i) Kenya Polytechnic
ii) Mombasa Polytechnic
iii) Kenya Science Teachers College
iv) Kenya Technical Teachers College
v) Kenya Railways
vi)) Metal Box Kenya Ltd.
vii) Kenya Canners Ltd.
viii) Kenya Power and Lighting
ix) Kenya Posts and Telecommunications

Below are two tables showing figures for technical schools graduates and the other showing figures for recruitement of these graduates for National Industrial Training centres through the Directorate of Industrial Training.

TECHNICAL SCHOOLS GRADUATES - YEARS 1976/1980

YEAR	1976	1977	1978	1979	1980
GRADUATES	1431	1525	1610	1799	1850

RECRUITMENT OF TRAINEES THROUGH DIRECTORATE OF INDUSTRIAL TRAINING
YEARS 1977 - 1980

TECHNICIAN APPRENTICES

	SECTOR	1977	1978	1979	1980
1.	Building and Civil Engineering	188	141	138	65
2.	Plantation Industry	2	5	5	38
3.	Printing, publishing and packing	-	2	1	4
4.	General Engineering and Allied	4	8	4	142
5.	Power and Communication	16	42	88	-
6.	Saw milling, Timber and furniture	-	-	-	-
7.	Food Processing	16	19	20	5
8.	Chemical and mfr	-	2	5	8
9.	Motor and Transport	20	15	49	75
10.	Textile Industries	8	5	6	-
11.	Commercial Distributive	-	-	-	-
12.	Others	12	30	9	-
	TOTAL	266	269	325	337
	Percentage of total technical school graduates	18.6	17.6	20.2	18.7

Note : Entry to technician apprenticeships is based on academic performance. Consequently the above figures contain both academic and Technical school leavers.

CRAFT APPRENTICES

SECTOR	1977	1978	1979	1980
1. Building and Civil Engineering	94	150	116	113
2. Plantation Industry	43	99	75	88
3. Printing, publishing and packing	17	10	16	7
4. General Engineering and Allied	89	52	64	157
5. Power and Communication	30	31	50	-
6. Sawmilling, Timber and furniture	1	-	10	10
7. Food Processing	29	37	33	10
8. Chemical and General mfr	20	22	28	13
9. Motor and Transport	62	203	99	331
10. Textile industries	22	37	7	9
11. Commerciale distributive	-	-	-	-
12. Others	12	77	69	29
TOTAL	418	718	567	796
Percentage of Technical School Graduates	29.2	47.0	35.2	44.2

NOTE: 1. Entry to Craft apprenticeships is normally restricted to Technical School leavers. However, a small percentage of (2%) those recruited do come from academic schools.

2. These figures do not include apprentices recruited outside of the Directorate's scheme, i.e. people recruited by industries with their own training schemes.

3. There is no official preference for technical school graduates in in admission to technician or craft apprenticeship courses.

SOURCES: 1982 PROJECT STATUS REPORT : Kenya-SIDA-Technical and Industrial Education Project-Republic of Kenya-Nairobi, February 1982.

RECRUITMENT OF TECHNICAL SCHOOL GRADUATES FOR DIT APPRENTICESHIP

YEAR	1981	1982	1983	1984
Technician	316	276	312	352
Craft	810	829	644	712
TOTAL Graduates	1.920	2.051	1.963	-
Percentage Recruited	58.6	53.9	48.7	-

From the above it is evident that about 50 per cent of the Technical School graduates find their way to craft and technician apprenticeship courses. However, as already stated theavailable infirmation is not very accurate because some of those admitted to the National Industrial Training Centres hold only academic qualifications while the figure of those graduates of Technical schools who are recruited for direct empoyment by private sector employers are not readily available: some of these graduates go on for further education of an academic kind in Form 5 and thereafter to the university.

The following studies carried on Technical education provide tracer study information on graduates of technical secondary schools :

1. Technical secondary school leavers and employment opportunities in Kenya by Daniel Sifuna, Kenyatta University College, Nairobi, 1982.
2. Technical Education section, Ministry of Education, 1974 Secondary Technical Schools Graduate follow-up study: summary of findings, August, 1975: and 1975 Technical Secondary School Graduate Follow-up study, summary of findings, October, 1976.
3. Occupational Transfer: Craft Training in Kenya : Comparative Review by Paul Bennet, 1984.
4. Dilemmas of Diversification: problems Associated with vocational Education in Developing countries: comparative Education by Kevin Lillis and Desmond Hogan, 1983.

The 1975 and 1976 tracer study of school leavers by the Technical Education section of the Ministry of Education suffered from very low response rates, i.e. 42 and 51 per cent respectively. These surveys were conducted only after a short time has elaspsed since the graduates left school. But the students were traced after the Directorate of Industrial Training had completed its recruitment of craft and technician apprentices. This is important because the technical schools were supposed to be geared to these DIT apprenticeship programmes. In both years, only about 30 per cent of the graduates succeeded in obtainning DIT apprenticeship programme.

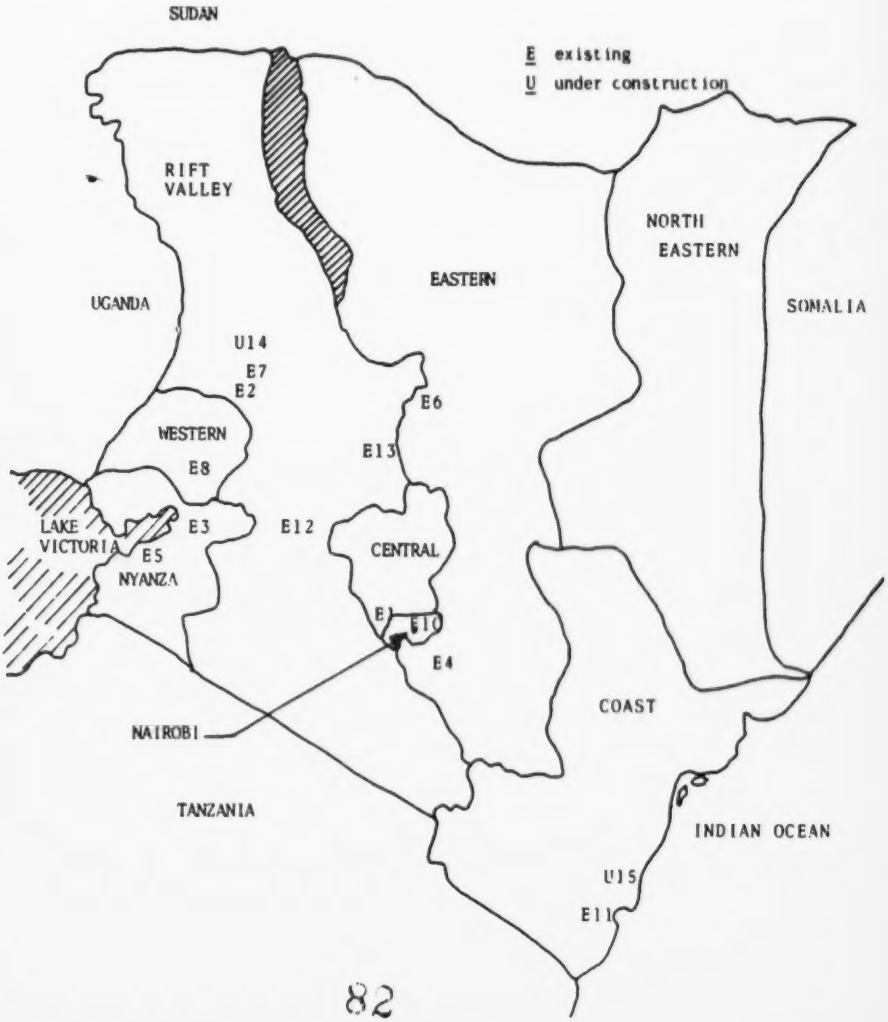
A second tracer study was conducted by Daniel Sifuna for the National Council for Science and Technology of Kenya in 1981. A sample of 726 Technical school graduates who took their 'O' level in 1980 was selected from 11 Technical Schools spread throughout the Republic. First, these students completed a questionnaire while still in Form 4. Then a follow-up of these students was attempted sometime after students had left Form 4. The report does not specify the time lapse until the follow-up was conducted. Information was obtained from 38.8 per cent of the 726 students.

Some three-quarters of those successfully traced had continued their studies in Form 5. Evidently, those entering the labour market were much harder to locate. Time and resources did not enable the follow-up of former students to be carried to an adequately successfull conclusion with regard to showing how students fared in the labour market. However, from available information, it is estimated that about 30 per cent go on to Form 5. There seems,therefore, little reason to believe that technical secondary education is terminal for a good number of students.

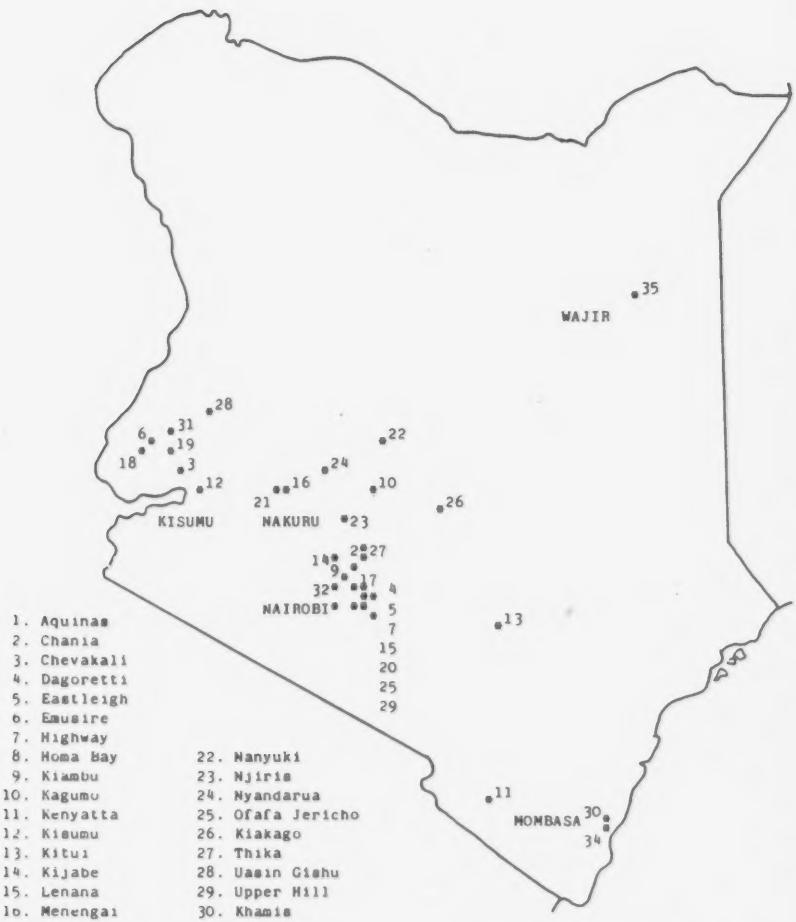
Clearly, a professionally conducted tracer study of technical school graduates is long overdue. Such a study would also provide a useful base line, for later appraising the effects of making the technical school courses more vocational in content. In the absence of more complete and reliable data, it is logical to conclude that these schools are not serving as a basis for further technical and vocational training for a large proportion of its graduates.

LOCATION OF TECHNICAL SCHOOLS

1. Kabete
2. Kaiboi
3. Machakos
4. Mawego
6. Meru
7. Rift Valley
8. Sigalagala
9. Thika
10. Nairobi T.H.
11. Mombasa T.H.
12. Nakuru T.H.
13. Nyeri (I.D.A.
14. Kitale
15. Mombasa (Shanzu)



LOCATION OF INDUSTRIAL EDUCATION SCHOOLS



1. Aquinas
2. Chania
3. Chevakali
4. Dagoretti
5. Eastleigh
6. Emusire
7. Highway
8. Homa Bay
9. Kiambu
10. Kagumo
11. Kenyatta
12. Kisumu
13. Kitui
14. Kijabe
15. Lenana
16. Menengai
17. Mangu
18. Manseno
19. Musingu
20. Nairobi
21. Nakuru Day
22. Nanyuki
23. Njiria
24. Nyandarua
25. Ofafa Jericho
26. Kiakago
27. Thika
28. Uasin Gishu
29. Upper Hill
30. Khamis
31. Kakamega
32. Alliance
33. K.Sil
34. Tudor
25. Wajir

WOOD/METAL WORKSHOPS
POWER/ELECTRICAL WORKSHOPS

2. TRACER STUDIES ON INDUSTRIAL EDUCATION IN KENYA

Industrial Education was introduced in Kenya's education system in early 1960s as a component of practical subjects which would be used to accelerate the modernisation of the economy. Since this diversification programme was started, the development optimism has changed towards a greater degree of pessimism or realism. So as to ascertain the impact of industrial education, a number of tracer studies have been carried out in Kenya which include the following :

1. Report on Employer's views of industrial education by D. Sifuna of Kenya University College, 1984.

2. A long term tracer study of industrial education of students from Nyandarua secondary school, by Martin Davis, Nairobi, 1984.

3. "Practical subjects in Kenya Academic secondary schools". Tracer study by Anders Närman, Swedish International Development Authority (SIDA), Stockholm 1985.

The tracer study of Anders Närman tried to trace a sample of 1.500 ex-students of Kenyan secondary schools who completed their 'O' level certificate of education after 4 years of secondary school in 1983 from 15 schools with industrial education and 5 schools as "control" schools. The sample was interviewed initially during the time of their examination, and a second time in 1984, one year after the examination. The 1984 interviews covered 71 per cent of the 1983 sample. In addition, in November 1983, a retrospective search was conducted on former students of industrial education who sat their 'O' level examinations between 1974 and 1982. In this exercise, 111 former students from three secondary schools from different parts of the country were interviewed and second-hand information was obtained on 203 out of a total of 481 possible students.

Some of the conclusions which were drawn about the students taking industrial education in Kenyan Secondary schools are outlined below.

1. A proportionately high percentage of industrial education students compared to the average holders of 'O' level certificates succeed in getting into Form V. On the other hand, there is a rather high number of industrial education students that are neither in formal school/training nor at work.

2. A large proportion of industrial education students who stayed at home looking for a job were found to be able to earn a subsistence living from different petty crafts. From the retrospective study, it was obvious that many exploited the industrial education skills in a productive way to support themselves.

3. Although all the students of industrial education hoped for further studies including the University, it was evident that a large number was inclined to accept other kinds of more specialised training (including apprenticeship training) with a higher priority for vocational training. Regarding future work, they have a higher inclination for blue-collar jobs in the technical/ practical sector.

4. From the retrospective study, it was found that some former students of industrial education were frustrated because they thought industrial education gave vocational skills while in fact it gave pre-vocational skills. The immediate problems to secure employment was temporary although the labour market prospects for 'O' level school leaver have also deteriorated considerably.

5. Industrial education seems to be very useful to the individuals. For those who are not able to enter the formal labour market, there are chances of self-employment. From the retrospective study, it was found that some ex-students of industrial education from Kitui High School had their own workshops, some even with a number of employees.

6. Industrial education gives a greater possibility for adaptation into a more technological society. In school/training, industrial education was found to be useful in the further learning of science subjects, above all physics. At vocational training institutions, ex-students of industrial education have at least an initial advantage compared to those who lack workshop training.

However, it is observed that the available data on tracer studies is not very adequate because the available ones cover only a very short duration. To establish the actual impact of industrial education on the ex-students, it is necessary to carry out a broad and thorough tracer study covering tho who have stayed out of school for a minimum period of 5 years since they completed their schooling.

3. EMPLOYMENT OPPORTUNITIES FOR GRADUATES OF KIAMBU INSTITUTE OF SCIENCE AND TECHNOLOGY (KIST)

The March 1979 Report of an Evaluation of Kiambu Institute of Science Technology gives interesting information on employment situation of the graduates of its first three building courses who came into the job market in 1976, 1977 and 1978* .

EMPLOYMENT SITUATION OF KIST BUILDING COURSE GRADUATES

TYPE OF EMPLOYMENT	number	percentage
Employment by firms, etc.	90	48.9
Self-empoyed	18	9.8
KIST construction and consultancy Firm/Production Unit	23	12.5
Harambee Institute of Technology	12	6.5
Teaching	7	3.8
Further Study	5	2.7
Not employed	7	3.8
No information	22	12.0

The above figure reveal that at least 72 percent easily joined the wage employment in the labour market without much difficulties. The percentage joining the labour market should infact be higher for graduates in other courses such as in engineering. It is also evident that the production unit creates a significant opportunity for employment. At that time those in wage employment started earning between KShs. 675/= and KShs. 1.500/= a month. The remuneration is much higher today by approximately 20 percent.

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* Report of an Evaluation of Kiambu Institute of Science and Technology, Kiambu, Kenya: March 1979.

It is also encouraging to see that 9.8 per cent of the graduates joint self-employment. Again building trade graduates are likely to enter into this category of employment because at a small-scale not much capital equipment would be required as would be the case in mechanical trades. Those who pursue light engineering courses such as electrical trade are also likely to easily join self-employment.

Those who stay unemployed are likely to be discriminating the available jobs either in the category of self-employment or in the category of wage employment. However if they stay unemployed for sometime they tend to become more realistic and readily accept what is available.

The building course graduates leave the institute with sufficient knowledge and skills to enable them to be self-employed as building contractors or subcontractors or to obtain salaried employment in Government and Private sectors. Some of the graduates have found employment as instructors in Youth Polytechnics or as teacher/instructors in the Harambee Institutes of Technology throughout the country.

A tracer study for graduates of Harambee institutes of technology throughout the country in the various courses would be very useful evaluation of the programme these institutions offer.

4. TRACER STUDY ON TECHNICAL GRADUATES WHO ARE DIRECTLY ABSORBED IN THE INFORMAL SECTOR

Graduates from technical schools who do not gain entry to further training courses, either sponsored by their employers or unsponsored, or to Form V, can be assumed, sooner or later, to find employment in the modern sector of the economy. Very few end up in the informal sector, to judge from House's survey carried out in Nairobi in July-September 1977* .

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* William J. House, Nairobi's informal sector ; Institute of Development Studies Nairobi Working Paper N° 347, December 1978.

The table shown below summarises the educational level of heads of businesses in the Nairobi informal sector, defined as enterprises operating "out of a temporary structure or from no structure at all" .

4. PERCENTAGE DISTRIBUTION OF EDUCATION LEVEL OF INFORMAL SECTOR BUSINESS HEADS BY MAJOR ACTIVITIES

EDUCATION	MANUFACTURING	TRADE	SERVICES
Completed Form 4 (11 years)	3.9 (11)	3.3 (4)	4.3 (7)
Incomplete Secondary (7-11 years- C.P.E. (7 years)	9.1 (26)	12.3 (15)	8.4 (14)
	32.3 (92)	28.7 (35)	26.2 (43)
No schooling	10.5 (30)	15.6 (19)	17.1 (28)

FIGURES IN PARENTHESIS ARE ACTUAL NUMBERS OF RESPONDENTS

As can be seen the majority of respondents had not even passed CPE and the handful of those who had completed Form 4 can be assumed to include very few if any technical leavers. The proportion of Form 4 technical school leavers joining the informal sector is likely to have increased substantially as a result of reduced chances of getting wage employment due to economic performance currently prevalent in Kenya today. This is another area which requires a comprehensive tracer study.

CONCLUSION

One of the main achievements of productive work programmes in technical and vocational education at craft and technical levels in Kenya can be said to be that it has proved capable of mobilising personnel and resources at a local level thus benefiting the local communities particularly in the rural settings. Some of the main constraints are lack of efficient organisation of the productive programmes and especially the marketing of services and products intended for sale. Most of the programmes have limited scopes because of inability to get some equipments whose capital and running costs especially on the part of spare parts is prohibitively high. The scope of these programmes is also constrained by lack of quality control and research facilities including personnel. However, where training and production can be realistically created, there is scope for considerable expansion of non-formal schemes that conceive pre-employment training as training is much more than vocational skills.

ANNEX I

Annex to guidelines

BASIC DATA

Name of Country : KENYA

Geographical Situation:
LAT 5°N and 5° S
LONG 34°E and 41°E
Area : 582.646 Km²
Population : 19.540.000 (1984)

Currency : KENYA SHILLINGS

1 K £= 20 Kenya Shillings US $ equivalent: 16.7325 (at OCT 1985)
Per capita income at current prices: (KSH. 3786.2 at 1984)

Gross National Product at Current Prices (1984) and Manpower Distribution

	GNP %	Manpower
Agriculture, Forestry and Fishing	31.9	19.8
Mining, manufacturing, repairing and quarrying	13.7	13.60
Electricity, water and construction	7.5	4.9
Commerce and finance	29.6	10.7
Transportation and occupation	5.6	5.7
Less Service Charges	15.5	45.3

Public Sector Finance K£' 000.000n

	Actual		Projected
	1982/83	1983/84	1984/85
Central Govt. revenu	845.9	994.9	1.153.1
Central Govt. Re-current expenditure	967.7	994.7	1.162.9
Current surplus or deficit (±)	-121.9	+000.1	- 9.7
Development expenditure	223.0	253.0	398.3
i) Central Govt. Re-current expenditure on Education	192.1	210.3	238.3
ii)Total Re-current Expenditure	1.014.7	1.051.1	1.220.8
percentage of (I) to (II)	18.9	20.0	19.5

Reccurent cost per pupil (1978/79) - day student only in US $

1979 10 $ = KSH. 7.328

Primary	73.7	US $
Lower Secondary	360.3	
Secondary (Aided)	360.3	
Upper general secondary	-	
Secondary technical	683.7	
Secondary I.E.	473.5	
Post Secondary Technical	1.364.6	
General Teacher Training	1.334.6	
Technical teacher training	3.378.8	
University	6.255.5	

Total spending on education 1983/84 as percentage of GNP = 11.0 %

Enrolment	1979 (difference of 1983 IN'000s (at least 5 years)		
	M F	Male	Female
Primary	3.698.2	2.249.2	2.074.6
Lower secondary) Upper Sec. (General) }	376.8	293.2	199.6
Upper Sec. (Technical)) Upper Sec. (Vocational) }	7.7	9.3	-
Pst. Sec. Technical) (Higher technician) }	4.5	9.5	-
Primary teacher training	9.9	6.8	4.5
Sec. teacher training	2.9	2.9	2.1
University of Nairobi	6.7	5.3	1.6

Source : Adapted from statistical abstract 1984, Economic survey 1985 and working party on Financing Higher Education 1982.

Distribution of active population among the major economic sectors by level of technical education qualification (as %)

	Technologists and engineers	Higher Technician	Mid-level technician	Skilled Workers	Unskilled Workers
Agriculture	0.04	0.06	3.1	6.2	8.9
Mining, manufacturing repairing and quarrying	0.6	0.5	6.0	38.3	17.5
Electricity, water and construction	3.9	3.6	3.6	34.2	12.7
Commerce and finance	2.3	1.7	3.7	12.6	50.8
Transportation and Communication	3.4	0.4	5.2	8.2	81.2
Govt. and other services	0.6	0.4	5.2	81.2	81.2

Source : Adapted from Republic of Kenya, Employment and Earnings in the modern sector, 1980.

COUNTRY PROFILE
TECHNICAL AND VOCATIONAL EDUCATION

LEGISLATION

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1. The 1963 Kenya African National Union (KANU) Manifesto.
2. The Sessional Paper N° 10 of 1965
3. The Educational Act (1968) Revised (1980)
4. The Board of Adult Education Act (1966)
5. The Teachers Service Commission Act (1967)
6. The University of Nairobi Act (1970) Revised 1985
7. The National Council of Science and Technology Act (1978)
8. Industrial Training Act (1979)
9. The Kenya National Examinations Council Act (1980)
10. Moi University Act (1984)
11. Kenyatta University Act (1985)
12. Higher Education Council Act (1985)

ADMINISTRATIVE STRUCTURE

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SEE ANNEX II-B OVERLEAF

STRUCTURE OF THE EDUCATIONAL SYSTEM

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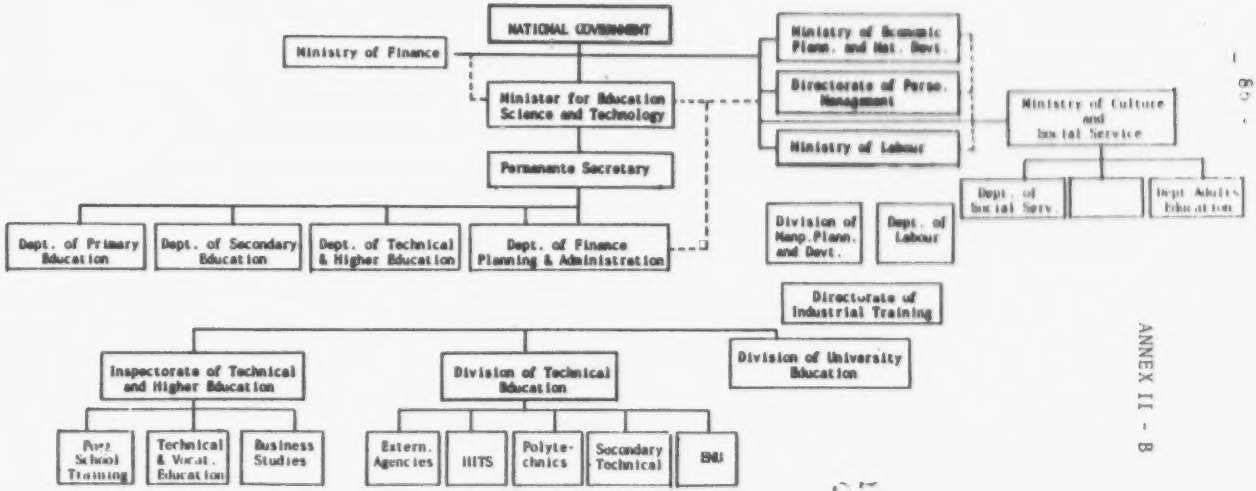
SEE ANNEX II-C OVERLEAF

▲ Entrance Examination
○ National Certificate
● National Diploma
■ Degree

COUNTRY PROFILE

TECHNICAL AND VOCATIONAL EDUCATION

ADMINISTRATIVE STRUCTURE



ANNEX II - B

ANNEX II - C

STRUCTURE OF EDUCATION 8-4-4